



FLORENCE COPPER INC.

1575 W. Hunt Highway, Florence, Arizona 85132 USA

florencecopper.com

March 12, 2021

David Albright
Manager, Groundwater Protection Section
USEPA Region 9 (WTR-4-2)
75 Hawthorne Street
San Francisco, CA 94105

**Re: Transmittal of Quarterly Temperature Logging Summary, Q1 2021
Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04
Florence Copper Project, Florence Arizona**

Dear Mr. Albright:

Florence Copper Inc. herewith transmits the enclosed Technical Memorandum, *Quarterly Temperature Logging Summary, Q1 2021, Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04, Florence Copper Project, Florence Arizona.*

Please contact me at 520-316-3710 if you require any additional information.

Sincerely,
Florence Copper Inc.



Brent Berg
General Manager

cc: Nancy Rumrill, U.S. Environmental Protection Agency

Enclosure

TECHNICAL MEMORANDUM

TO: David Albright
USEPA Region 9

FROM: Brent Berg
Florence Copper

DATE: March 12, 2021

SUBJECT: Quarterly Temperature Logging Summary, Q1 2021
Production Test Facility Westbay Wells: WB-01, WB-02, WB-03, and WB-04
Florence Copper Inc., Florence, Arizona

Introduction

This Technical Memorandum presents the results of temperature logging for Production Test Facility (PTF) Westbay wells WB-01, WB-02, WB-03, and WB-04 during February 2021 for Florence Copper Inc. (Florence Copper) in Florence, Arizona. Westbay wells WB-01, WB-02, WB-03, and WB-04 are located within the Underground Injection Control (UIC) Permitted Area of Review for UIC Permit R9UIC-AZ3-FY11-1 and were completed as Class III multi-level monitoring wells for the PTF (Figure 1).

Florence Copper contracted Southwest Exploration Services, LLC to perform temperature logging to verify the absence of fluid movement through vertical channels adjacent to the well, in accordance with the 25 July 2019 UIC Permit Minor Modification.

Wells Logged

Florence Copper completed temperature logging of Westbay wells WB-01, WB-02, WB-03, and WB-04. Temperature runs were completed at least 4 hours apart after the wells had been shut in for 24 hours. The temperature logs were performed as listed in the following table.

Well ID	Temperature Log Date	Temperature Log Run 1 Time	Temperature Log Run 2 Time
WB-01	02/17/2021	7:33 AM	11:33 AM
WB-02	02/17/2021	10:03 AM	2:03 PM
WB-03	02/17/2021	9:17 AM	1:17 PM
WB-04	02/17/2021	8:25 AM	12:25 PM

As-built diagrams of the Westbay wells are provided in Appendix A and the temperature logs are provided in Appendix B. Daily average flow rates for the injection and recovery wells, and daily average water level elevations for the recovery and observation wells, are provided in Appendix C for the day temperature logs were conducted.

Findings

The temperature logging results for Westbay wells WB-01, WB-02, WB-03, and WB-04 show no anomalies that would indicate that there is flow behind the well casings. The temperature logs for each logging event reflect similar instrument readings for both the initial and secondary runs, resulting in parallel temperature traces on each of the log records for the entirety of the well.

Enclosures:

Figure 1 – Well Locations

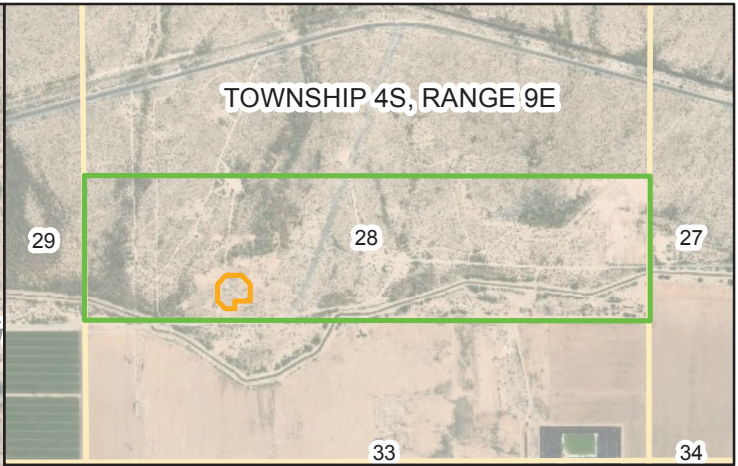
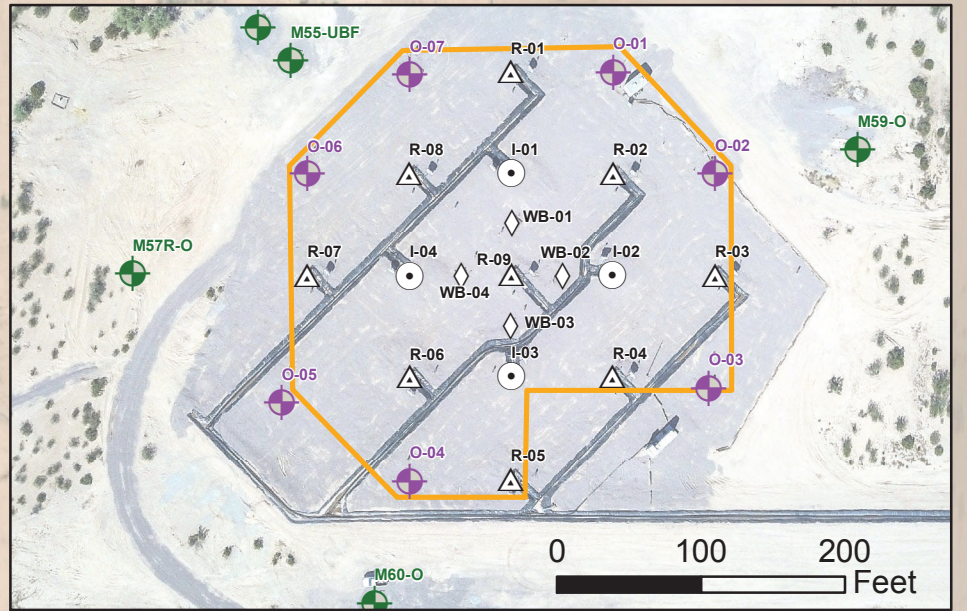
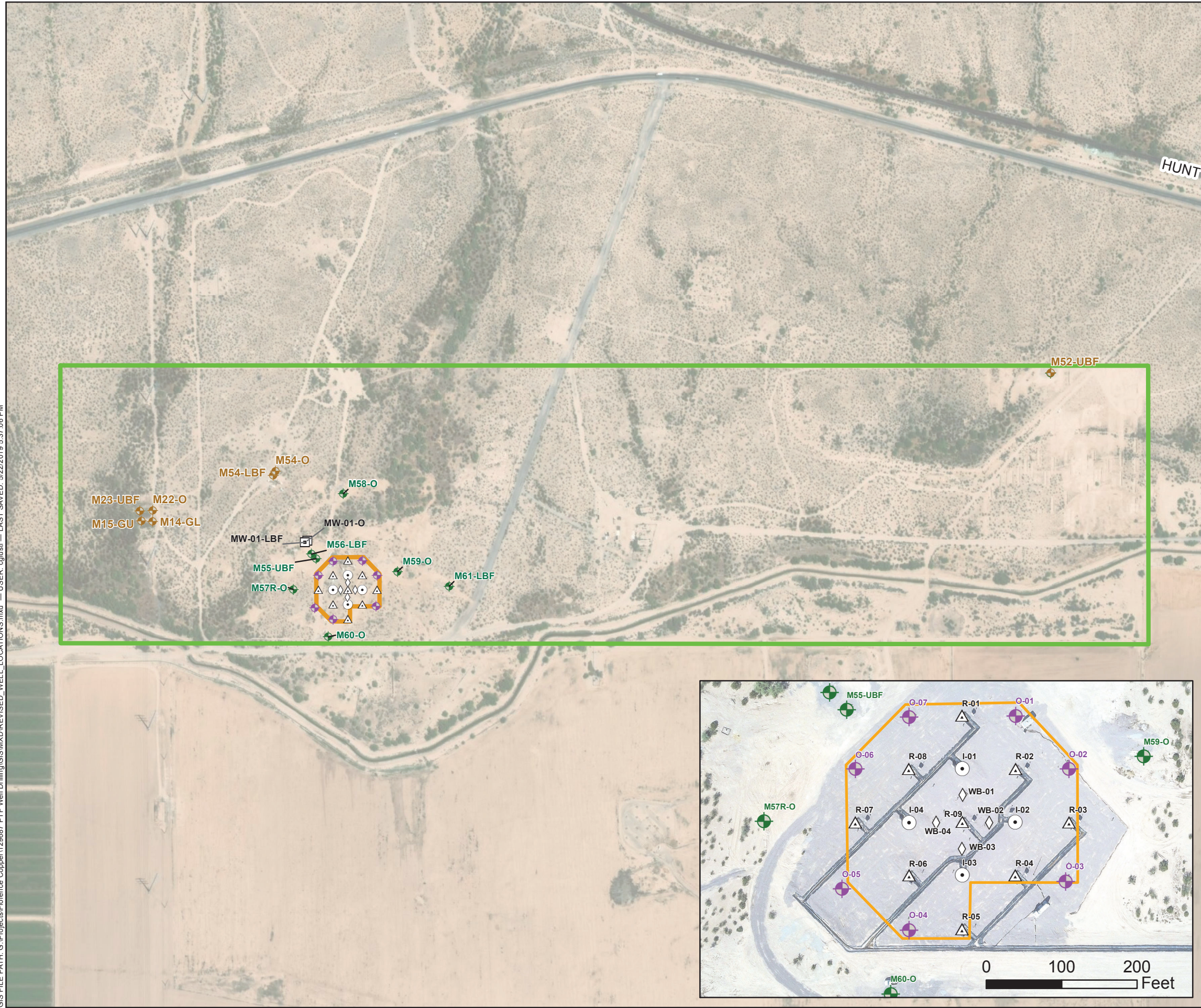
Appendix A – Westbay Well As-Built Diagrams

Appendix B – Q1 2021 Temperature Logs

Appendix C – Daily Average Flow Rates and Water Level Elevations

FIGURE

GIS FILE PATH: G:\Projects\Florence Copper\129687 PTF Well Drilling\GISMXD\REVISED_WELL_LOCATIONS.mxd — USER: cglusti — LAST SAVED: 5/22/2019 5:37:06 PM



LEGEND

- INJECTION WELL
- RECOVERY WELL
- WESTBAY WELL
- OPERATIONAL WELL
- OBSERVATION WELL
- SUPPLEMENTAL MONITORING WELL
- POINY-OF-COMPLIANCE WELL

STATE LAND LEASE

PTF WELLFIELD

NOTES

- ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
- AERIAL IMAGERY SOURCE: ESRI



0 500 1,000
SCALE IN FEET

HALEY
ALDRICH

FLORENCE COPPER PROJECT
FLORENCE, ARIZONA

WELL LOCATIONS

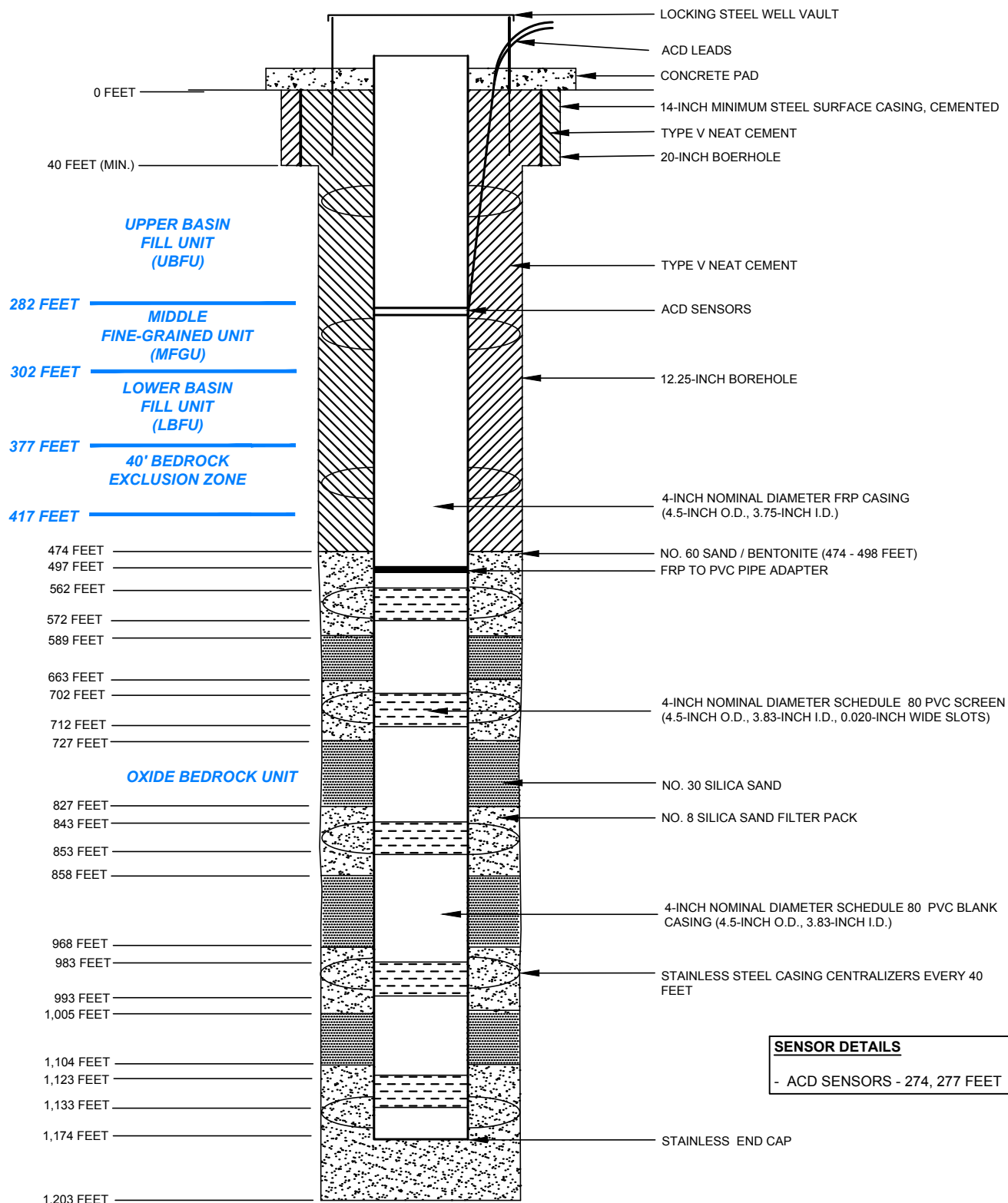
FLORENCE
COPPER

JUNE 2020

FIGURE 1

APPENDIX A

Westbay Well As-Built Diagrams



NOTES

1. WELL REGISTRATION NO.: 55-227226
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.34 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS



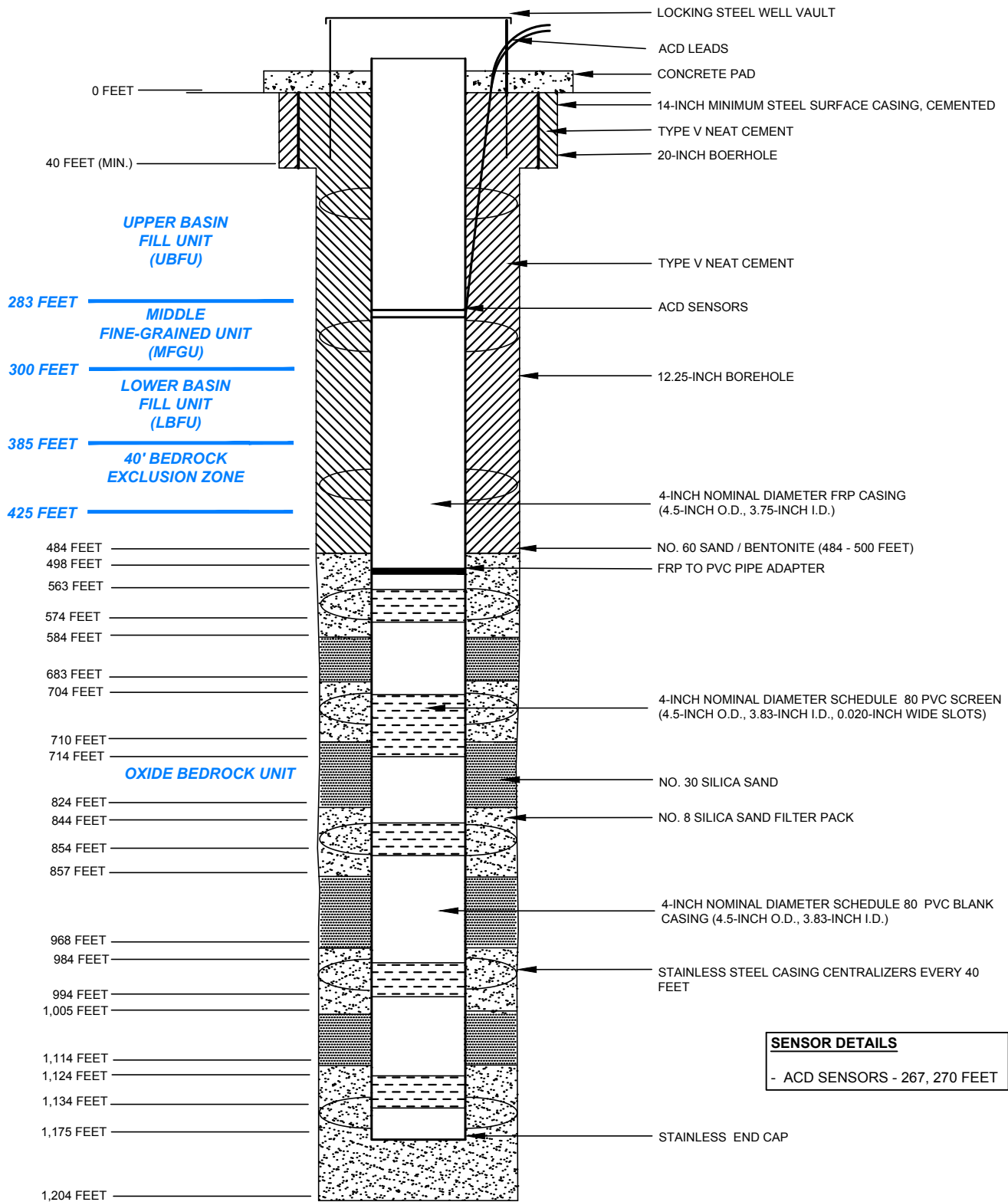
PRODUCTION TEST FACILITY
 FLORENCE COPPER, INC.
 FLORENCE, ARIZONA

WB-01 WESTBAY WELL AS-BUILT DIAGRAM



SCALE: NOT TO SCALE
 SEPTEMBER 2018

FIGURE 2



NOTES

1. WELL REGISTRATION NO.: 55-227227
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.75 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

HALEY ALDRICH

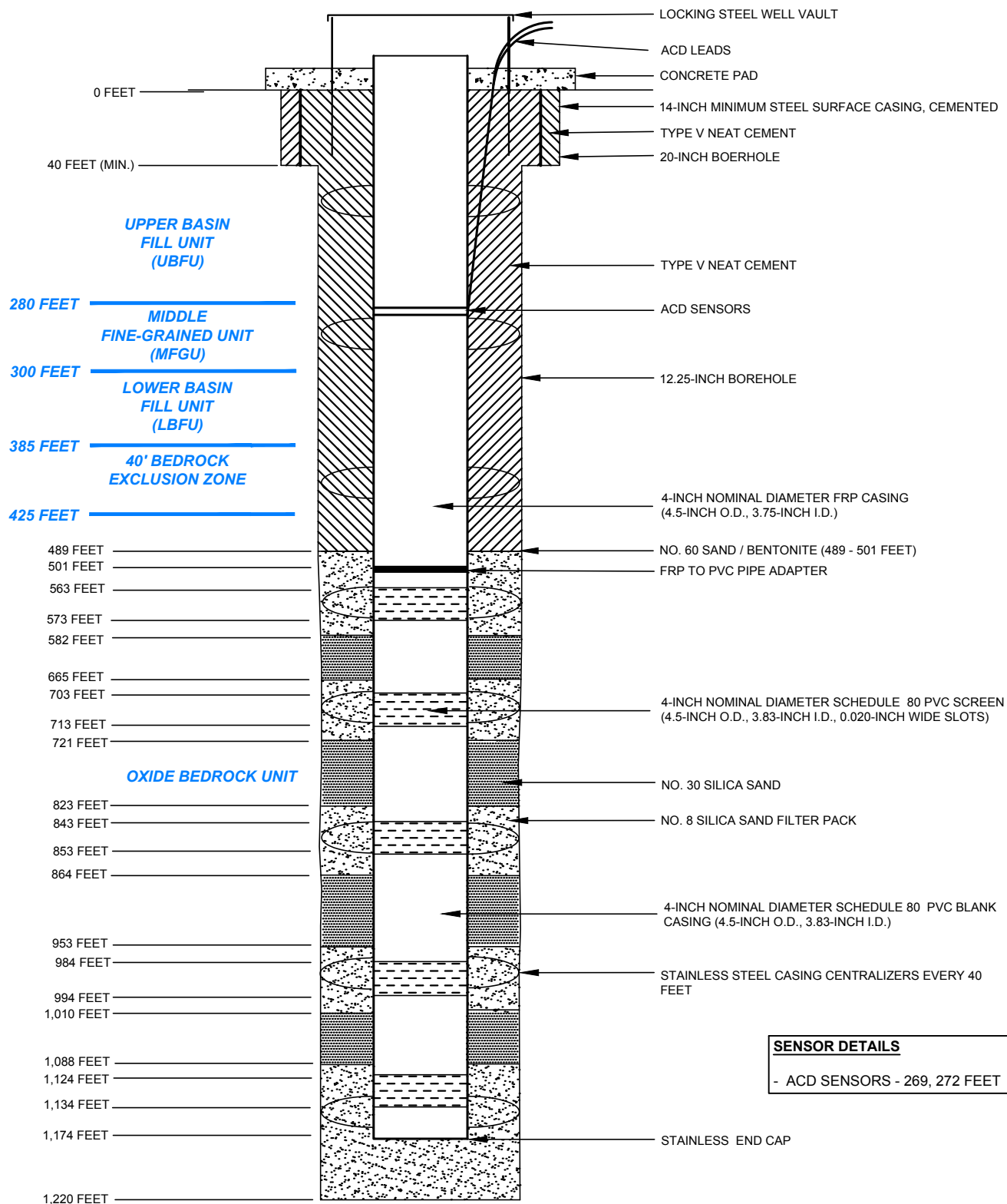
PRODUCTION TEST FACILITY
FLORENCE COPPER, INC.
FLORENCE, ARIZONA

WB-02 WESTBAY WELL AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 2



NOTES

1. WELL REGISTRATION NO.: 55-227228
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1478.99 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

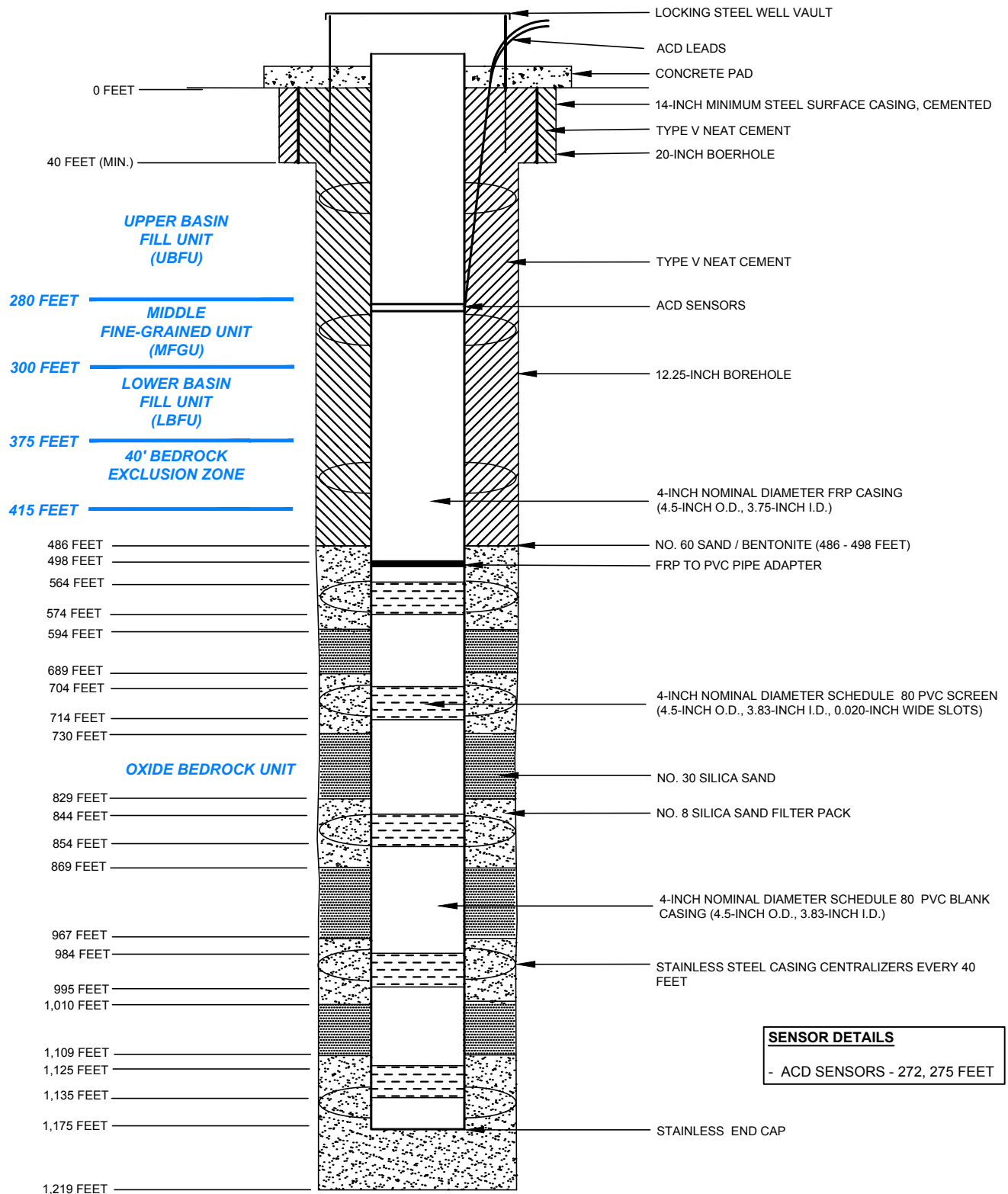
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FLORENCE, ARIZONA

WB-03 WESTBAY WELL AS-BUILT DIAGRAM

FLORENCE COPPER INC.

SCALE: NOT TO SCALE
SEPTEMBER 2018



SENSOR DETAILS

- ACD SENSORS - 272, 275 FEET

NOTES

1. WELL REGISTRATION NO.: 55-227229
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.79 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS

**HALEY
ALDRICH**

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FLORENCE COPPER, INC.
FLORENCE, ARIZONA

WB-04 WESTBAY WELL AS-BUILT DIAGRAM

**FLORENCE
COPPER INC.**

SCALE: NOT TO SCALE
SEPTEMBER 2018

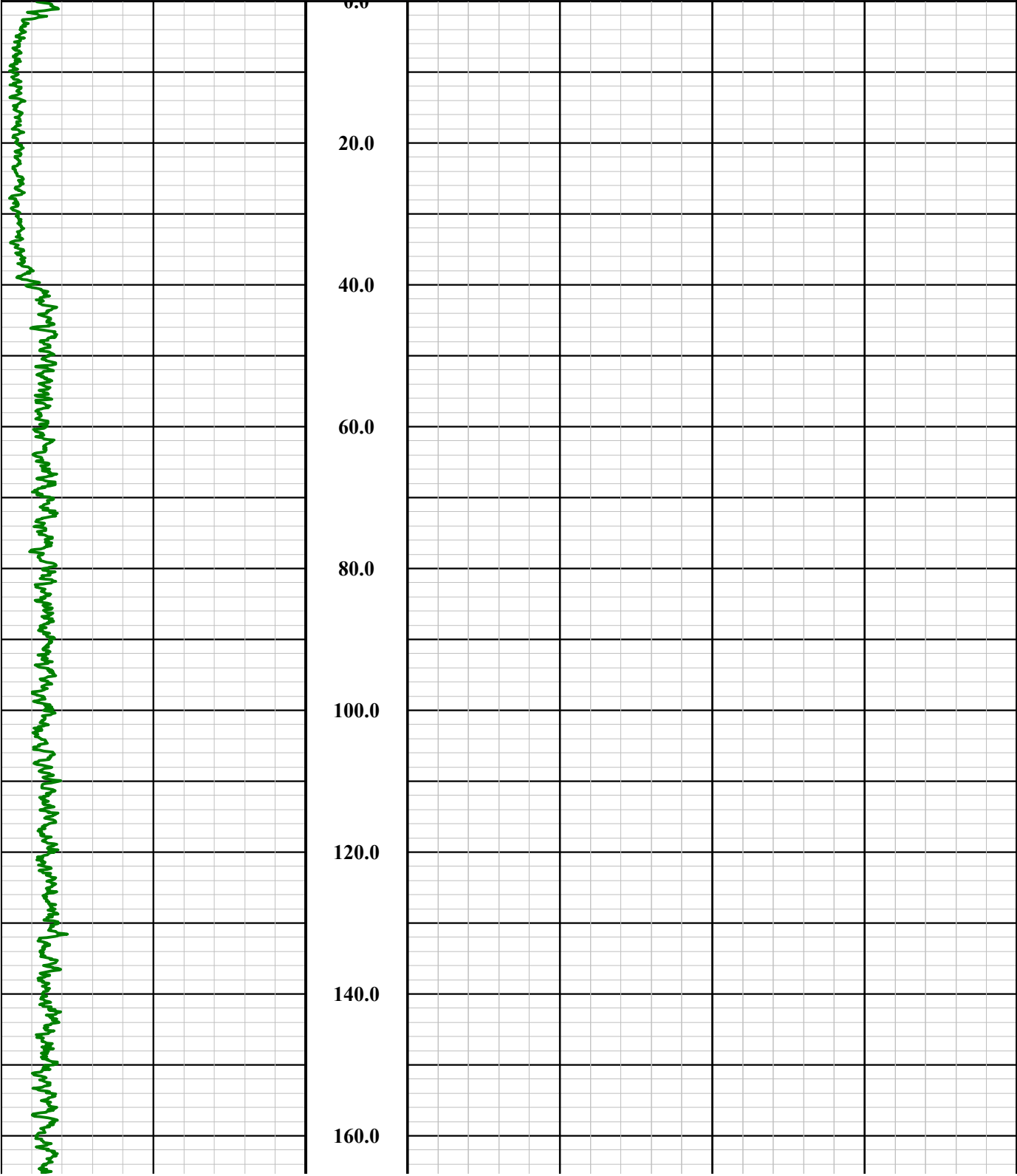
FIGURE 2

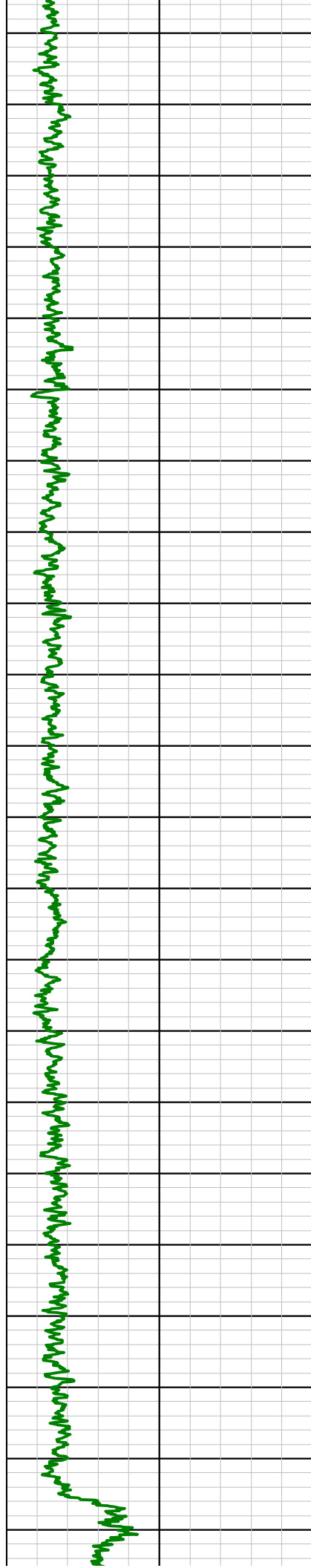
APPENDIX B

Q1 2021 Temperature Logs

Hole Information	Depth 1in:20ft	Temperature (07:33 AM)	
		55	Deg F 95
Well Name: WB-01		Temperature (11:33 AM)	
Survey Date: 02-17-21		55	Deg F 95
Elevation: 1478.56 Ft		Differential Temperature	
Northing (NAD83): 746167.49		-2	Deg F 2
Easting (NAD83): 847695.07			
Shut In Time: 24 Hours 0 Min			
Base of Lowermost USDW: 302 Ft			
Nat. Gamma			
0	API	400	

WB-01 Temperature Evaluation





180.0

200.0

220.0

240.0

260.0

280.0

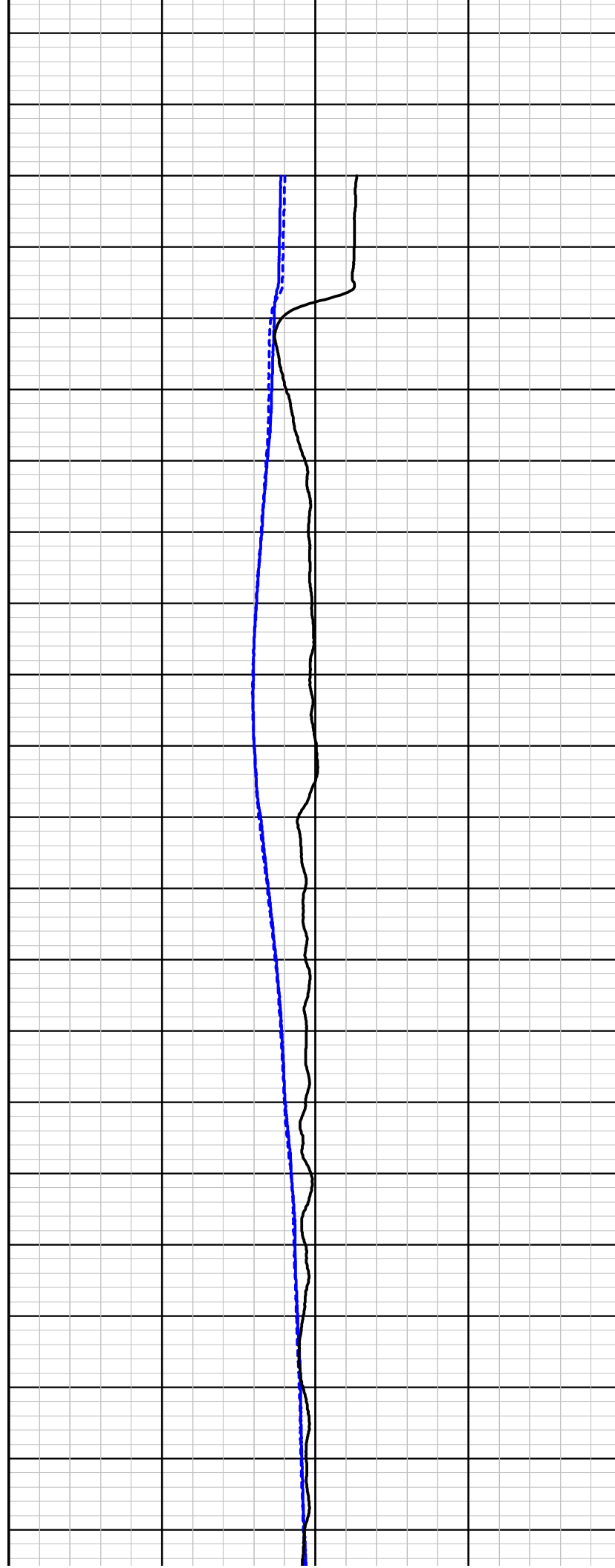
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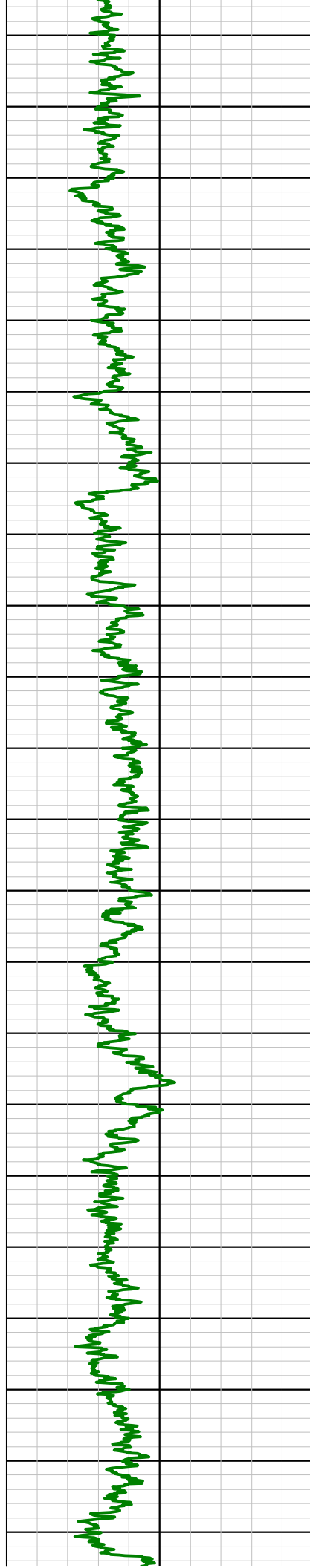
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340.0

360.0

380.0





400.0

420.0

440.0

460.0

480.0

500.0

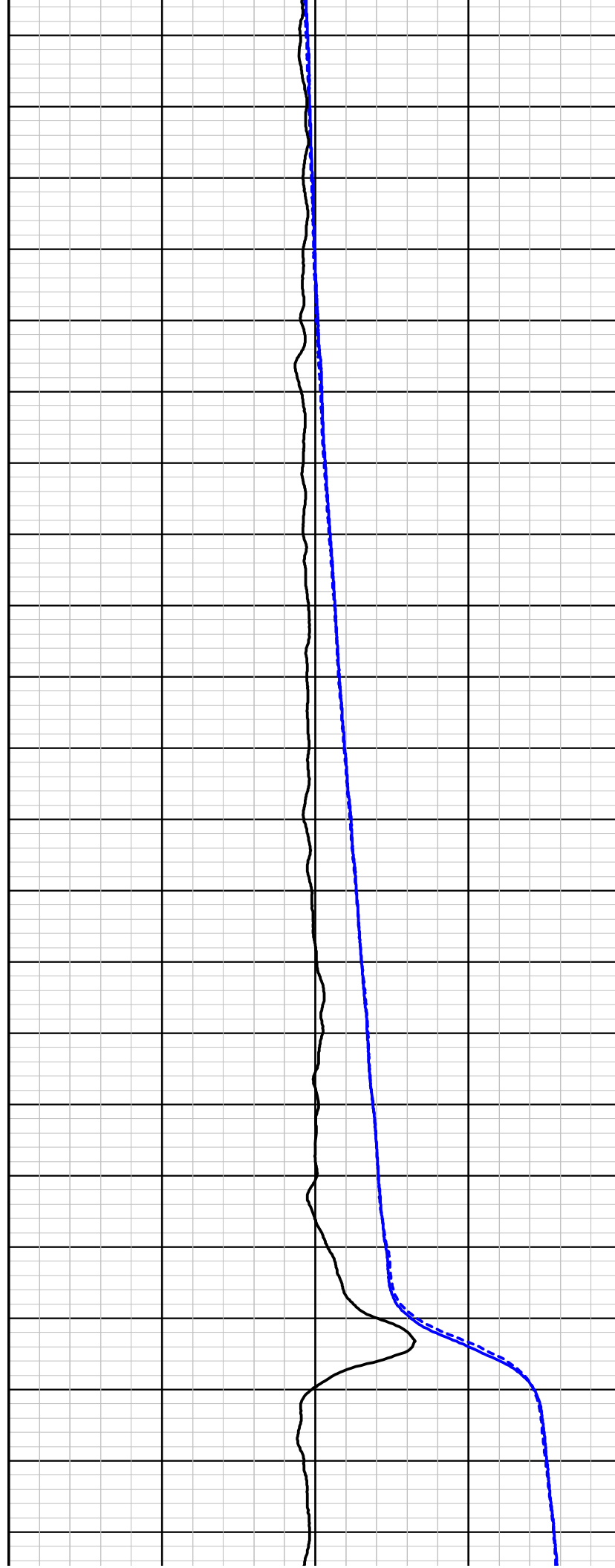
520.0

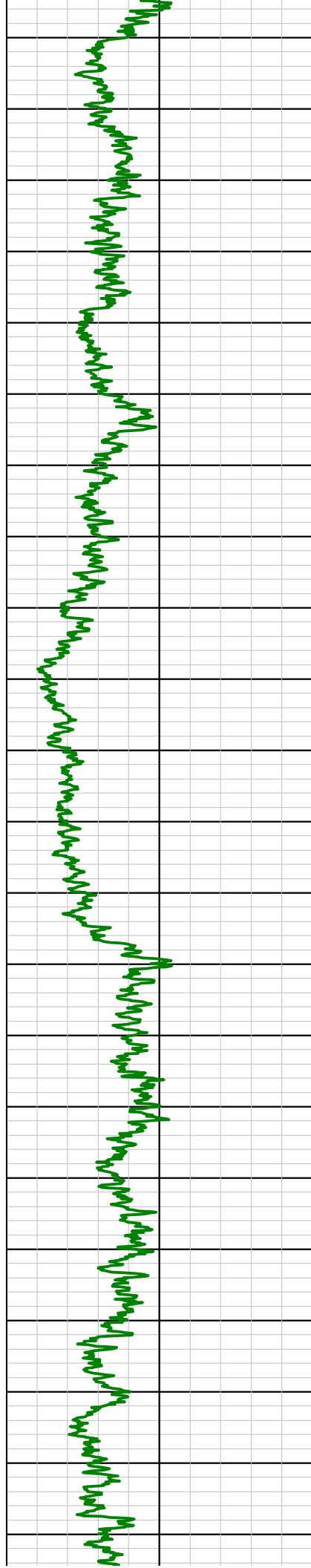
540.0

560.0

580.0

600.0





620.0

640.0

660.0

680.0

700.0

720.0

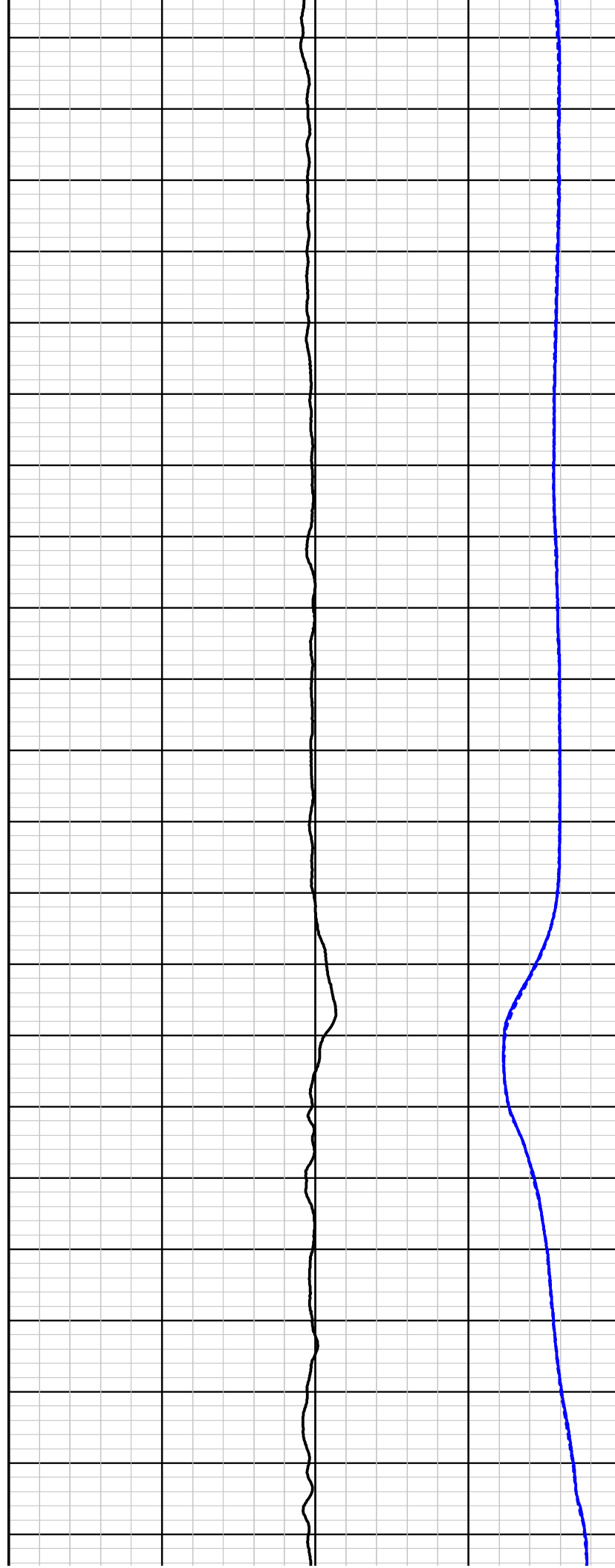
740.0

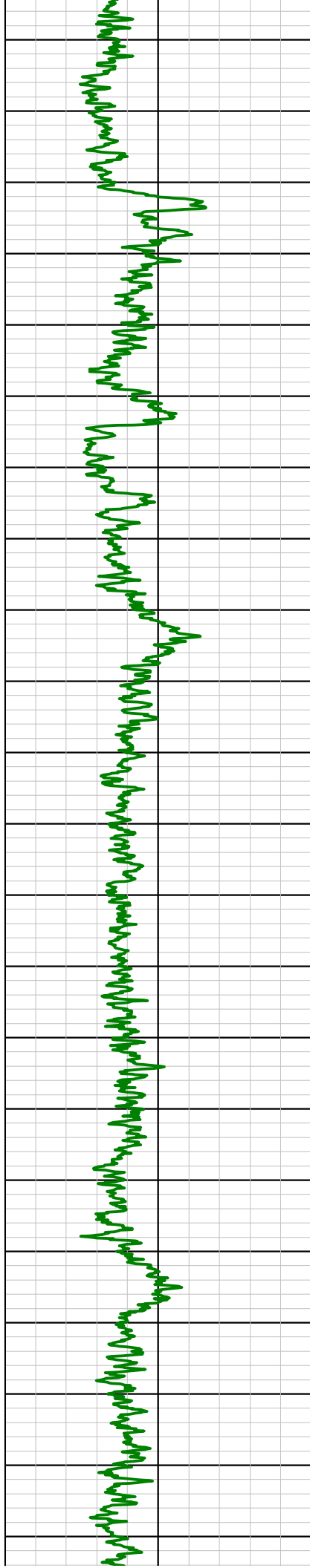
760.0

780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

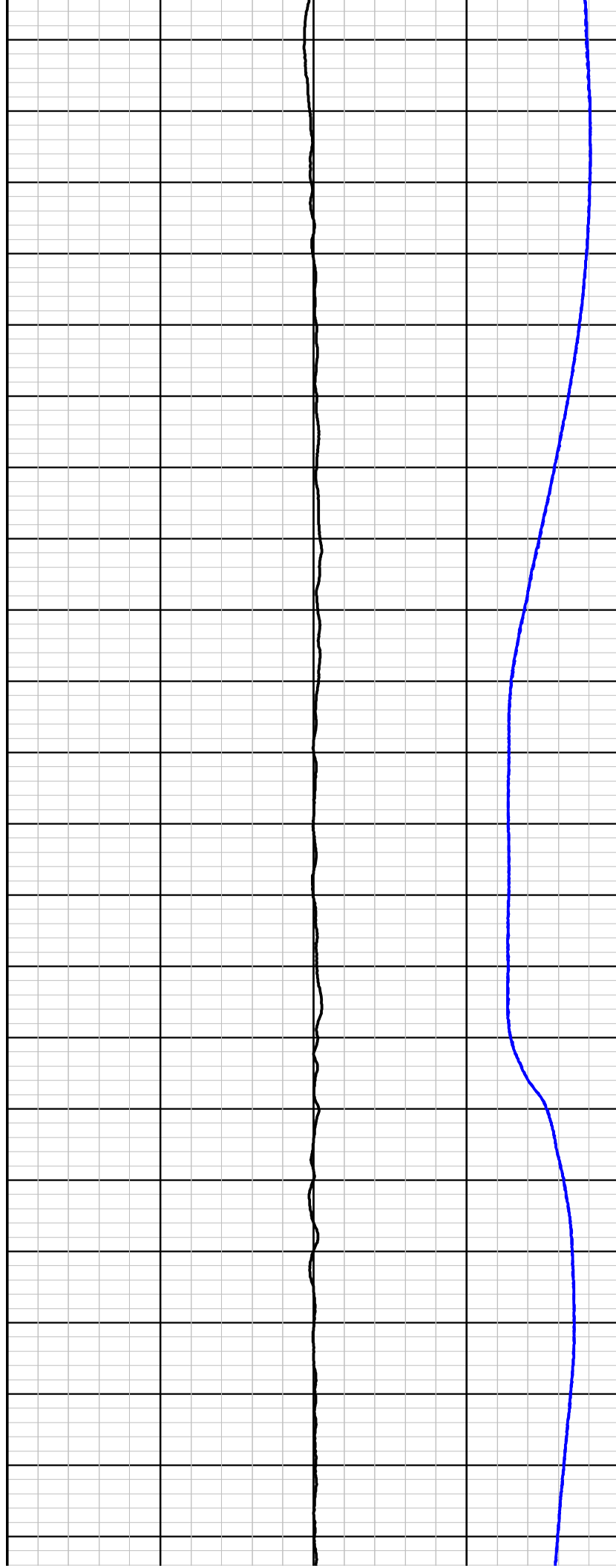
960.0

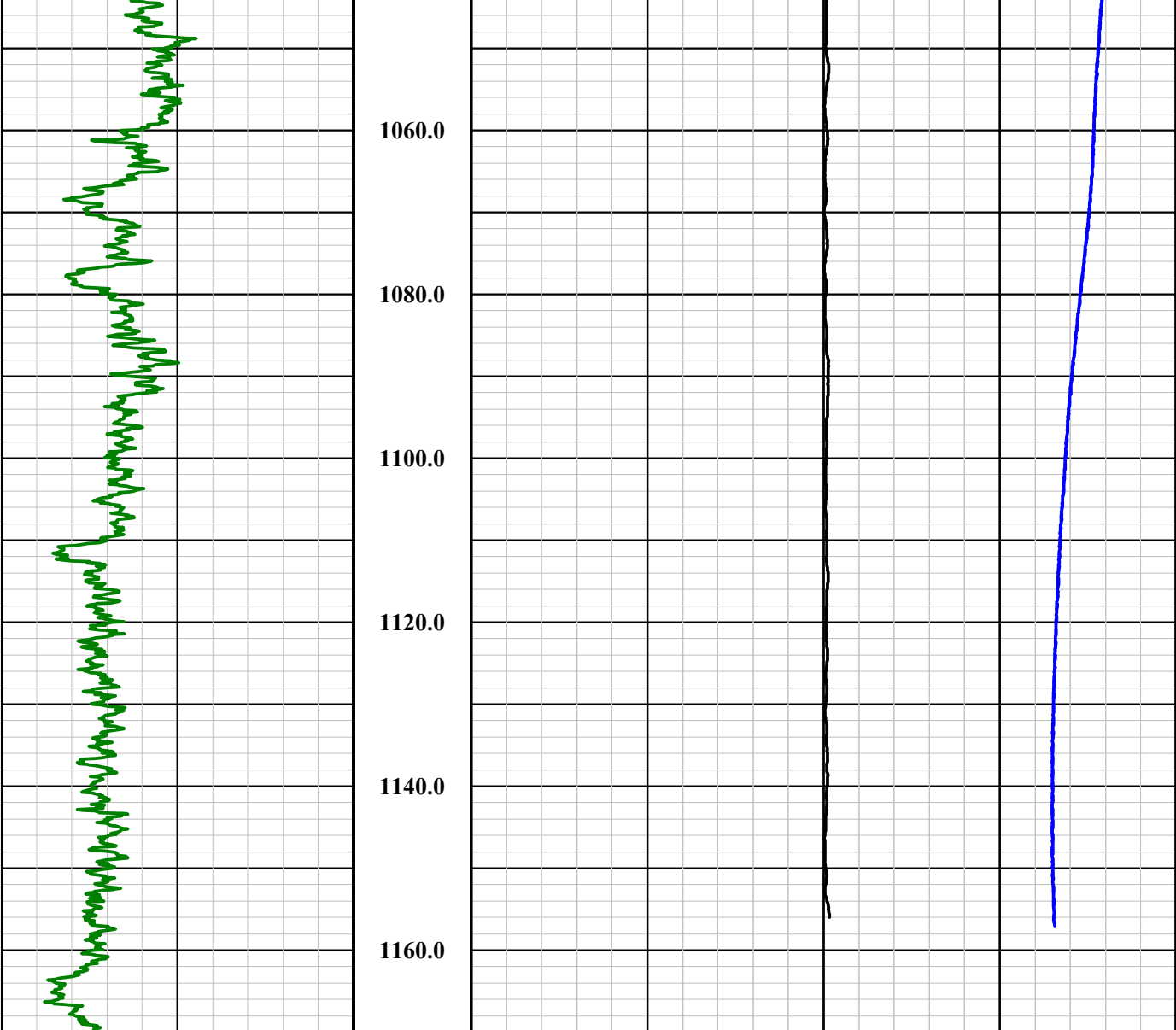
980.0

1000.0

1020.0

1040.0





WB-01 Temperature Evaluation

0 API 400

Nat. Gamma

Base of Lowermost USDW: 302 Ft

Shut In Time: 24 Hours 0 Min

Easting (NAD83): 847695.07

Northing (NAD83): 746167.49

Elevation: 1478.56 Ft

Survey Date: 02-17-21

Well Name: WB-01

Hole Information

1in:20ft
Depth

-2 Deg F 2

Differential Temperature

55 Deg F 95

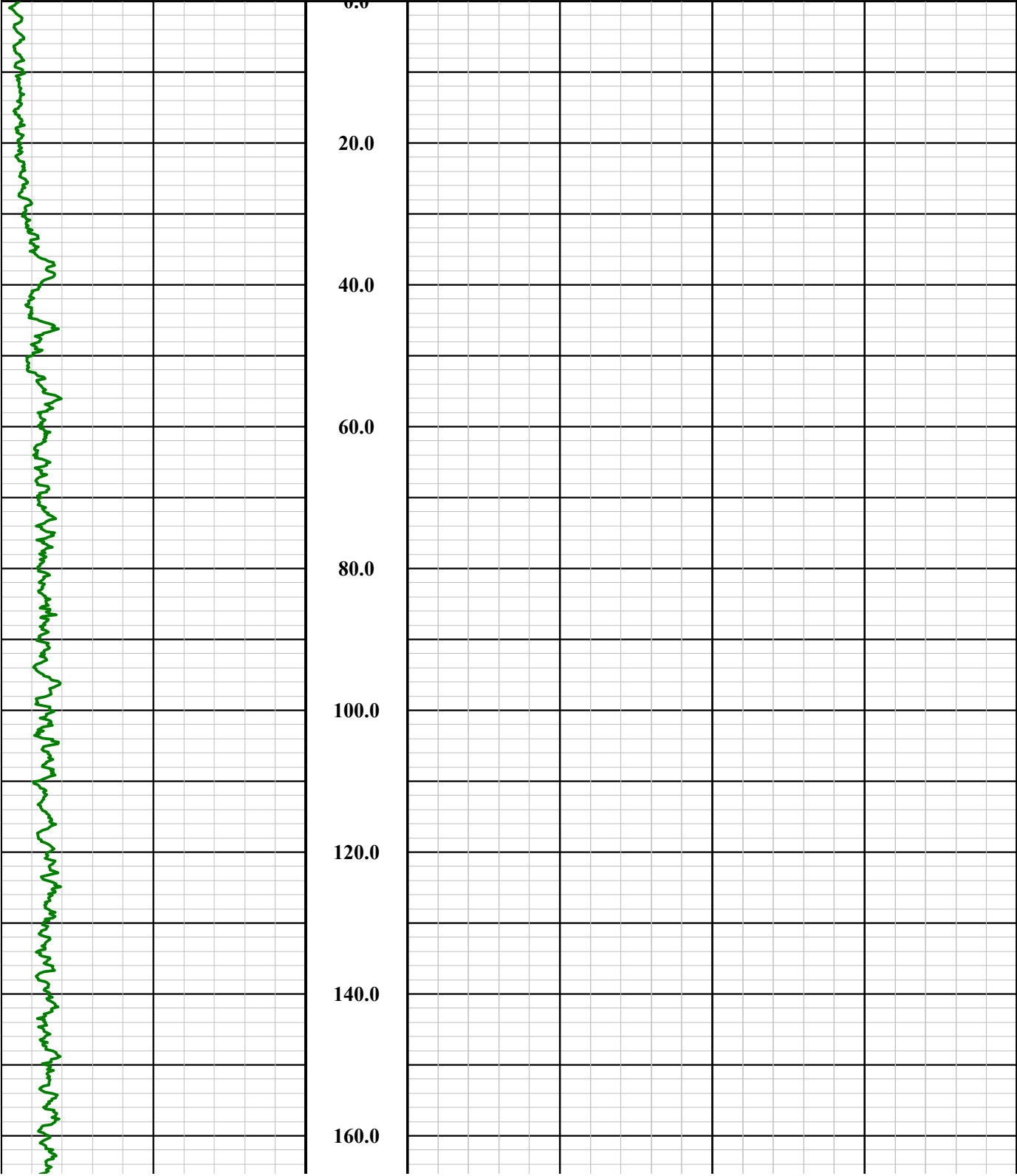
Temperature (11:33 AM)

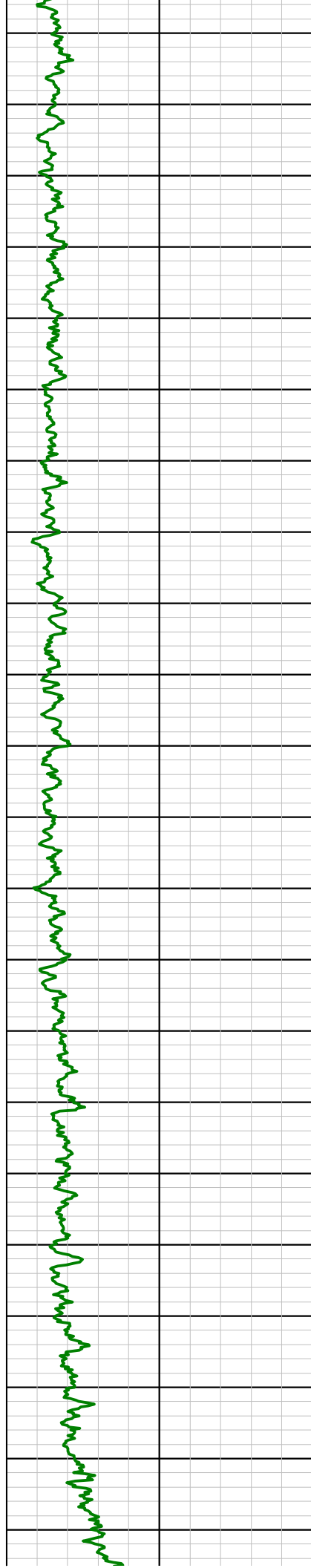
55 Deg F 95

Temperature (07:33 AM)

Hole Information		Depth	Temperature (10:03 AM)		
		1 in:20ft	60	Deg F	100
Well Name: WB-02 Survey Date: 02-17-21 Elevation: 1478.27 Ft Northing (NAD83): 746131.32 Easting (NAD83): 847730.23 Shut In Time: 24 Hours 0 Min Base of Lowermost USDW: 300 Ft			Temperature (2:03 PM)		
			60	Deg F	100
			Differential Temperature		
			-2	Deg F	2
Nat. Gamma					
0 API 400					

WB-02 Temperature Evaluation





180.0

200.0

220.0

240.0

260.0

280.0

300.0

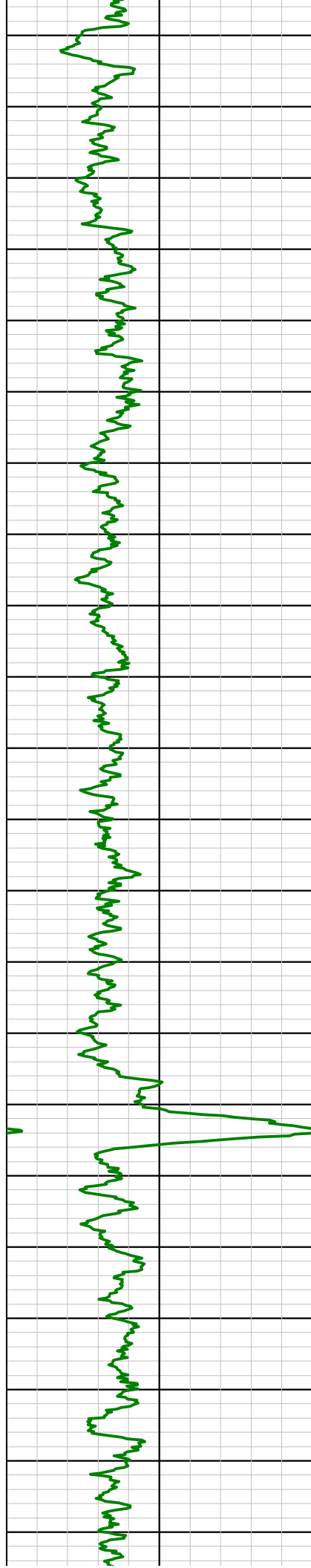
320.0

340.0

360.0

380.0





400.0

420.0

440.0

460.0

480.0

500.0

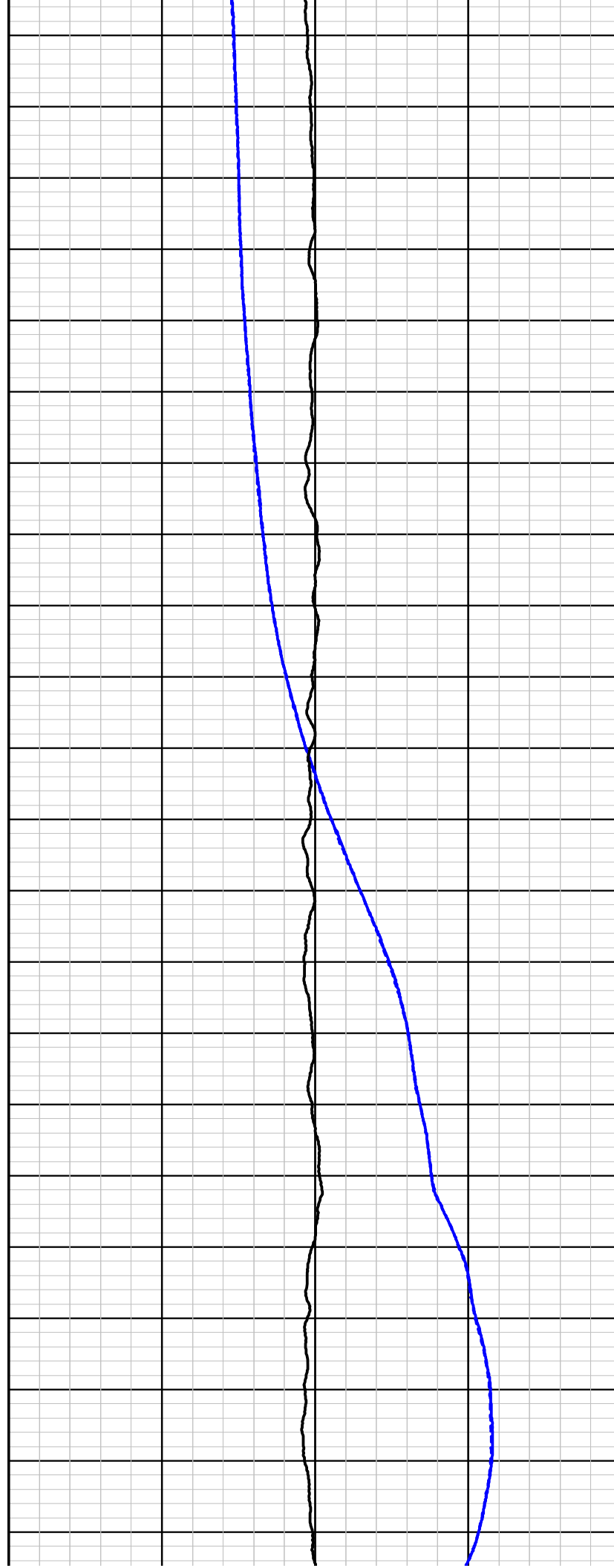
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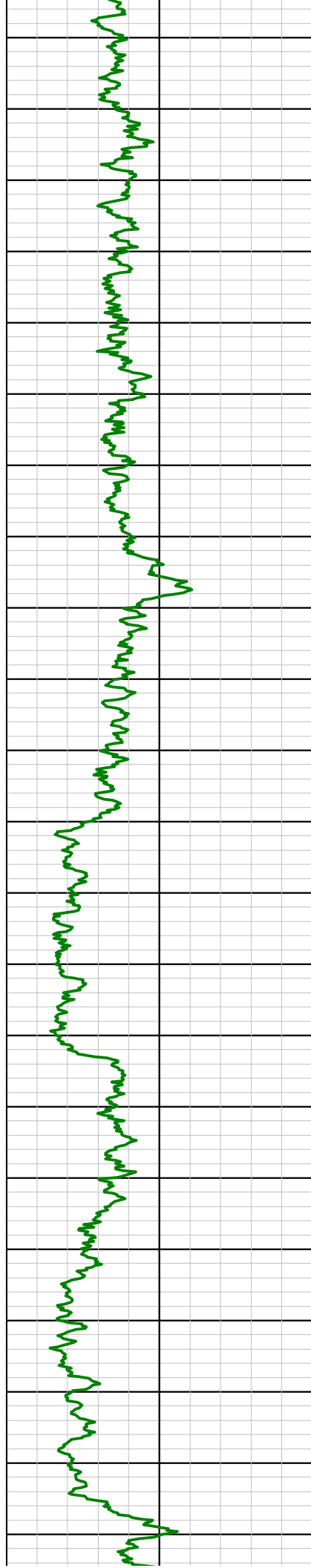
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560.0

580.0

600.0





620.0

640.0

660.0

680.0

700.0

720.0

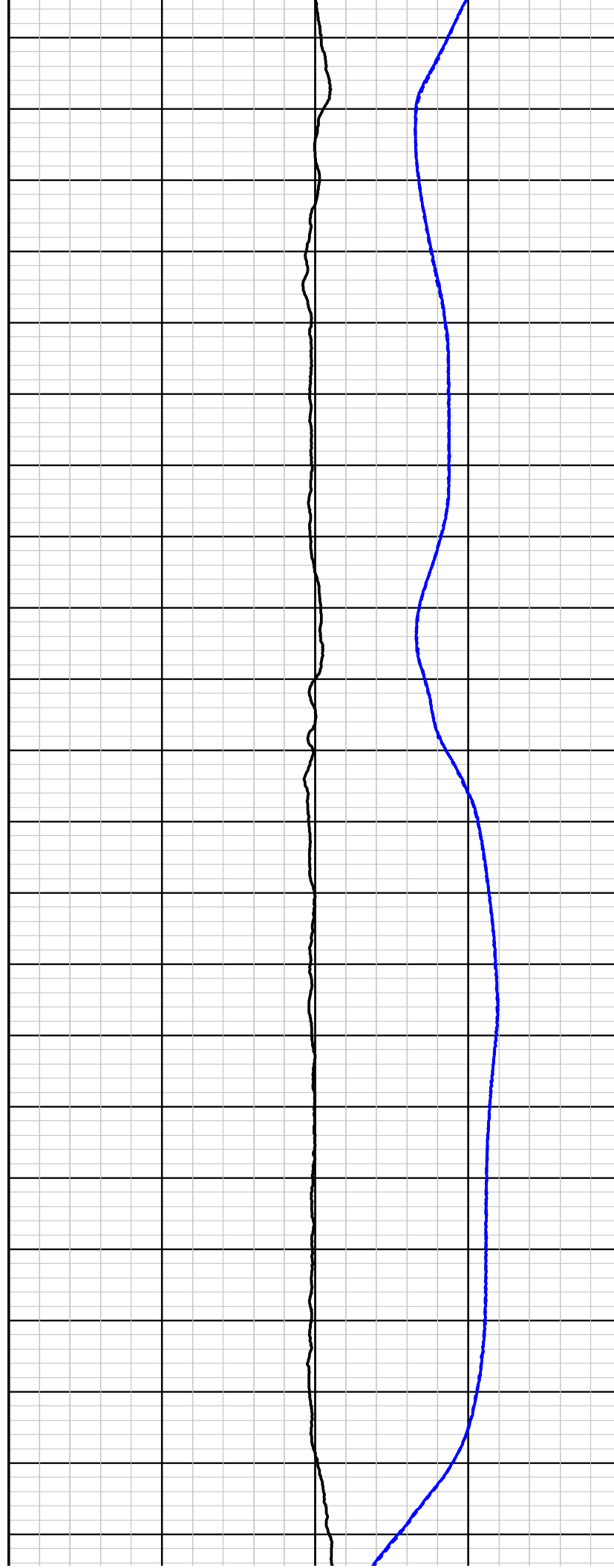
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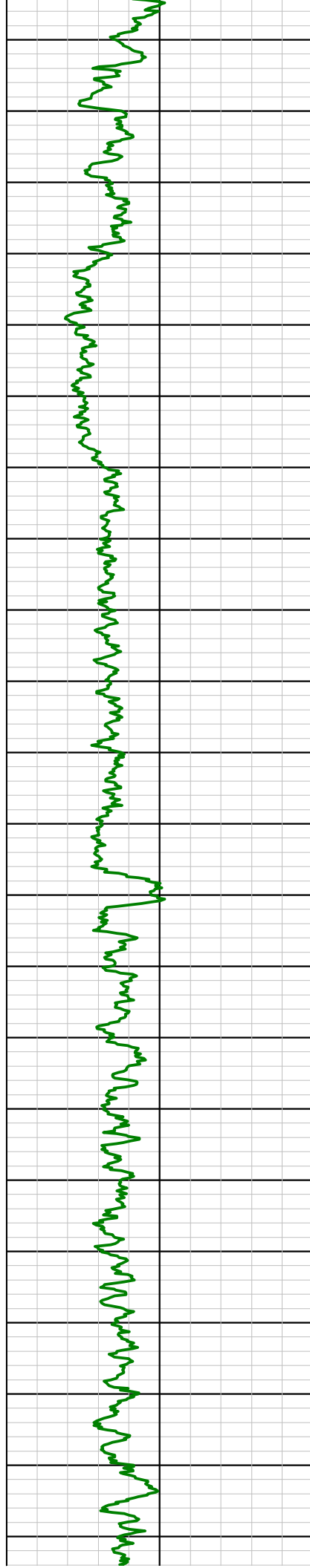
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780.0

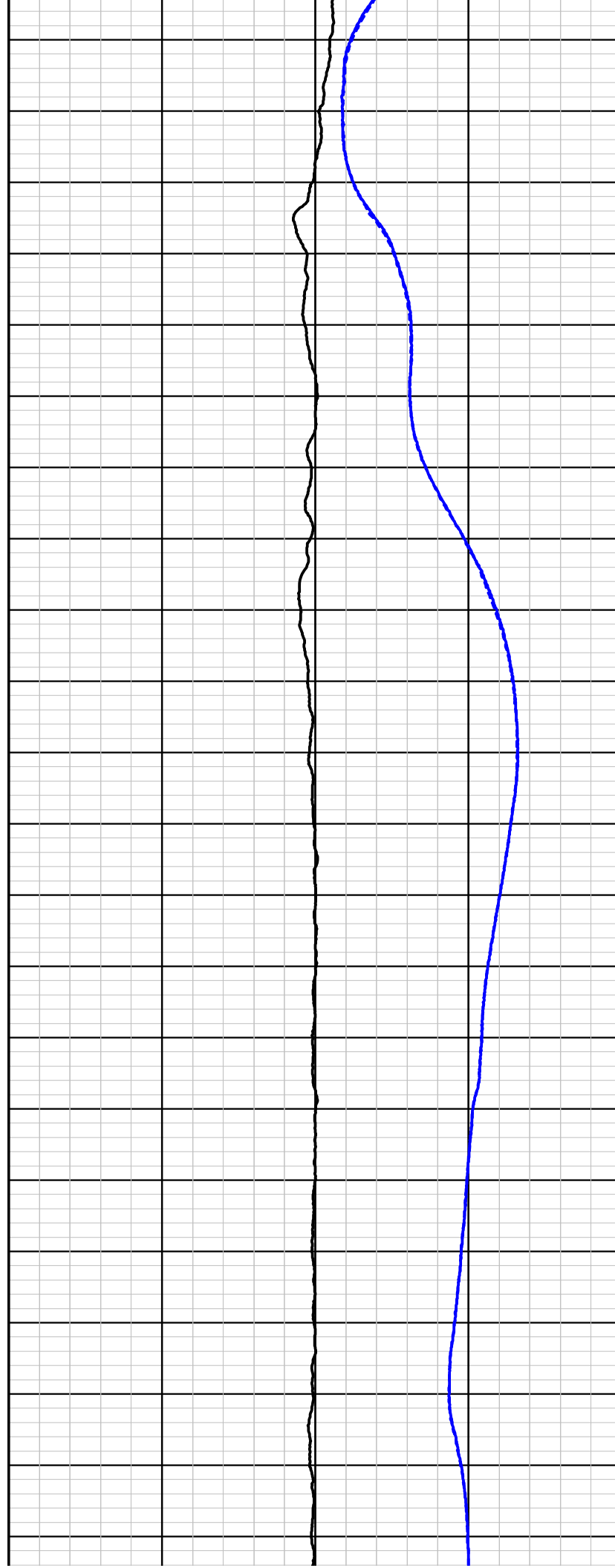
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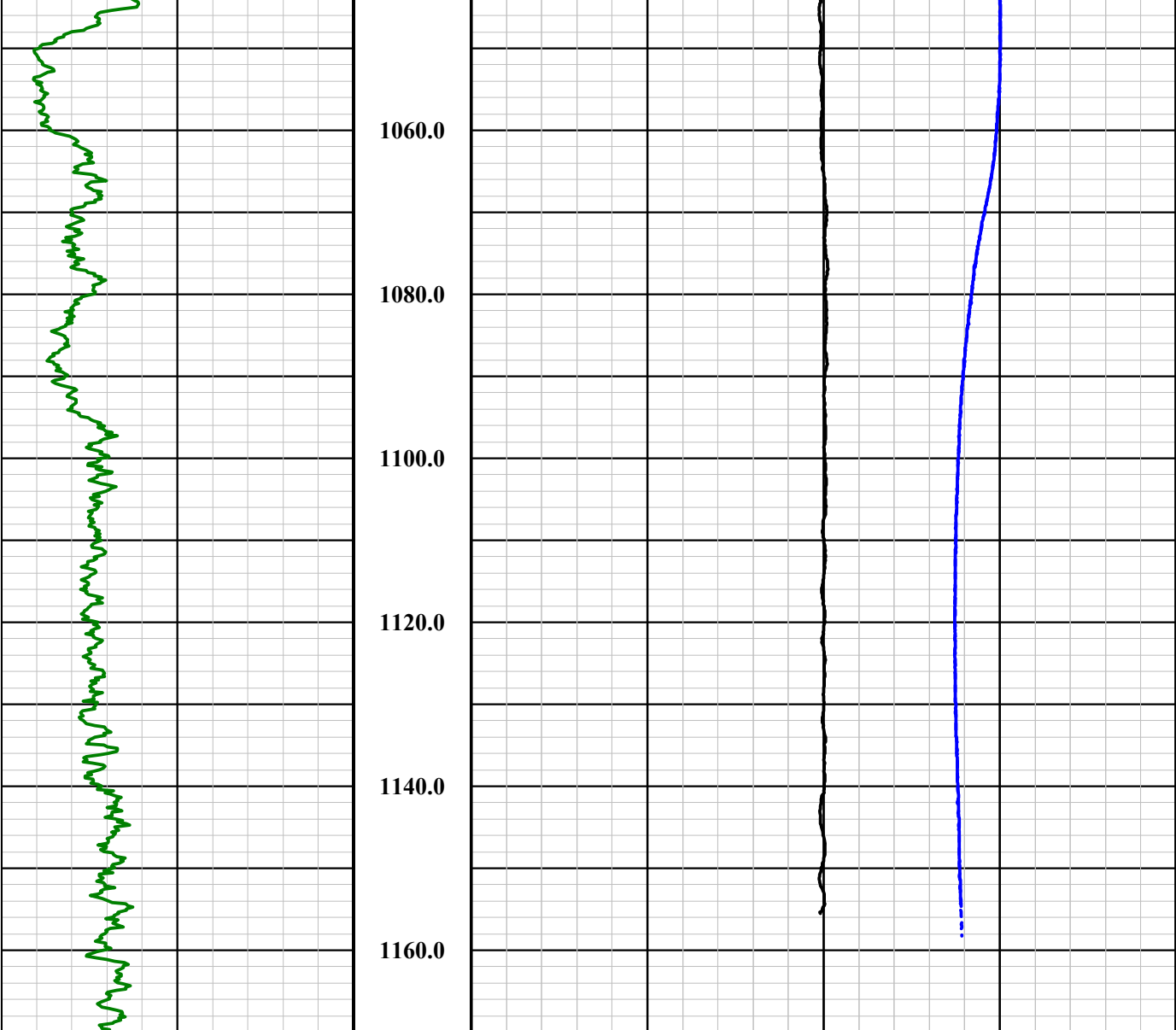
820.0





840.0
860.0
880.0
900.0
920.0
940.0
960.0
980.0
1000.0
1020.0
1040.0





WB-02 Temperature Evaluation

0 API 400

Nat. Gamma

Base of Lowermost USDW: 300 Ft

Shut In Time: 24 Hours 0 Min

Easting (NAD83): 847730.23

Northing (NAD83): 746131.32

Elevation: 1478.27 Ft

Survey Date: 02-17-21

Well Name: WB-02

Hole Information

1in:20ft
Depth

-2

Deg F

2

Differential Temperature

60

Deg F

100

Temperature (2:03 PM)

60

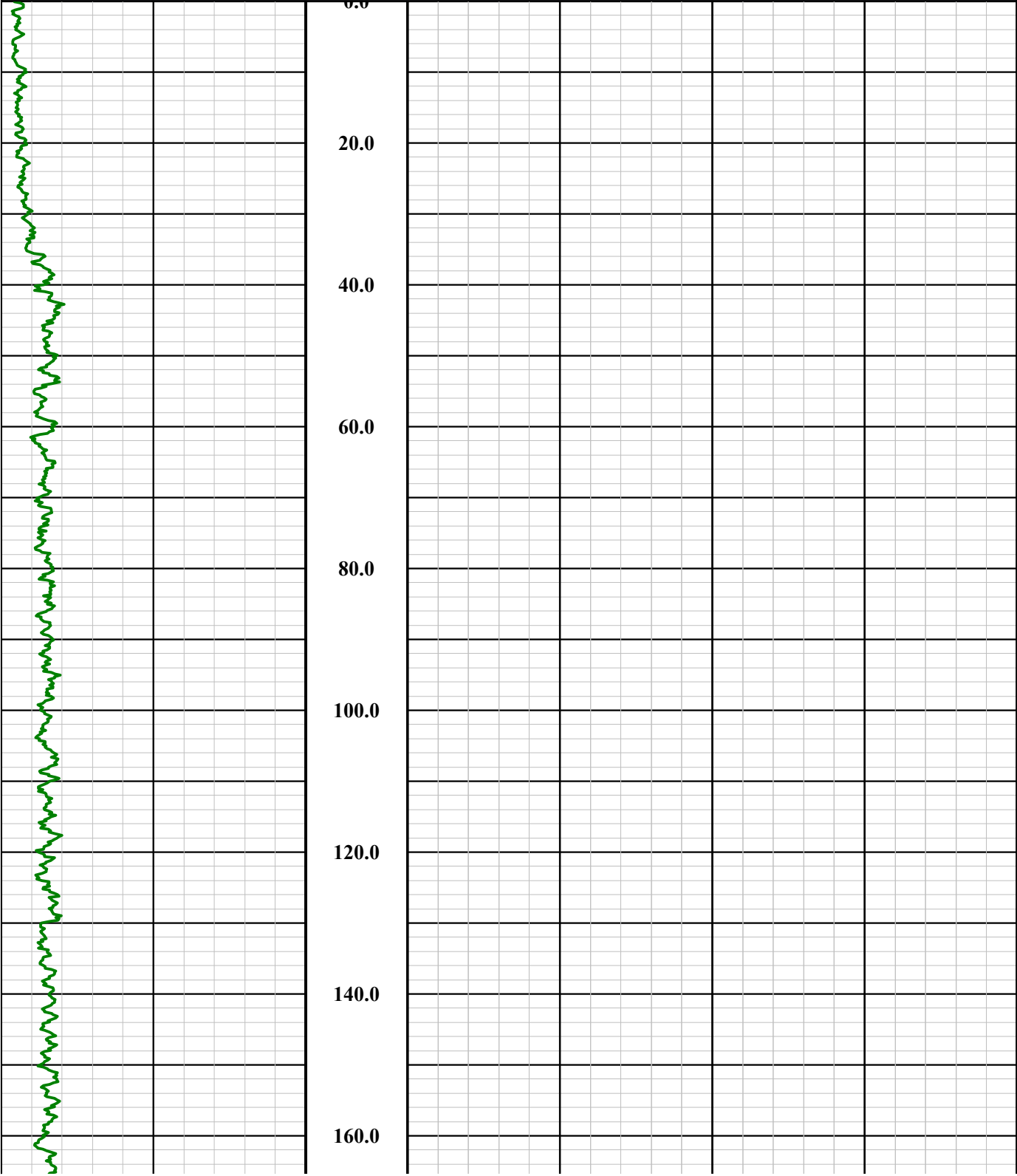
Deg F

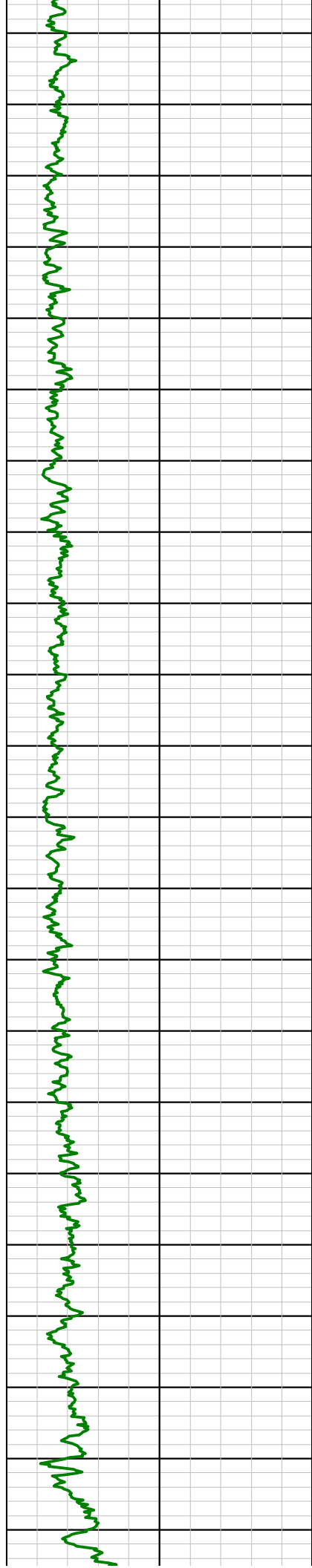
100

Temperature (10:03 AM)

Hole Information	Depth	Temperature (9:17 AM)	
	1in:20ft	60	Deg F 100
Well Name: WB-03		Temperature (1:17 PM)	
Survey Date: 02-17-21		60	Deg F 100
Elevation: 1478.18 Ft		Differential Temperature	
Northing (NAD83): 746096.49		-2	Deg F 2
Easting (NAD83): 847694.07			
Shut In Time: 24 Hours 0 Min			
Base of Lowermost USDW: 300 Ft			
Nat. Gamma			
0 API 400			

WB-03 Temperature Evaluation





180.0

200.0

220.0

240.0

260.0

280.0

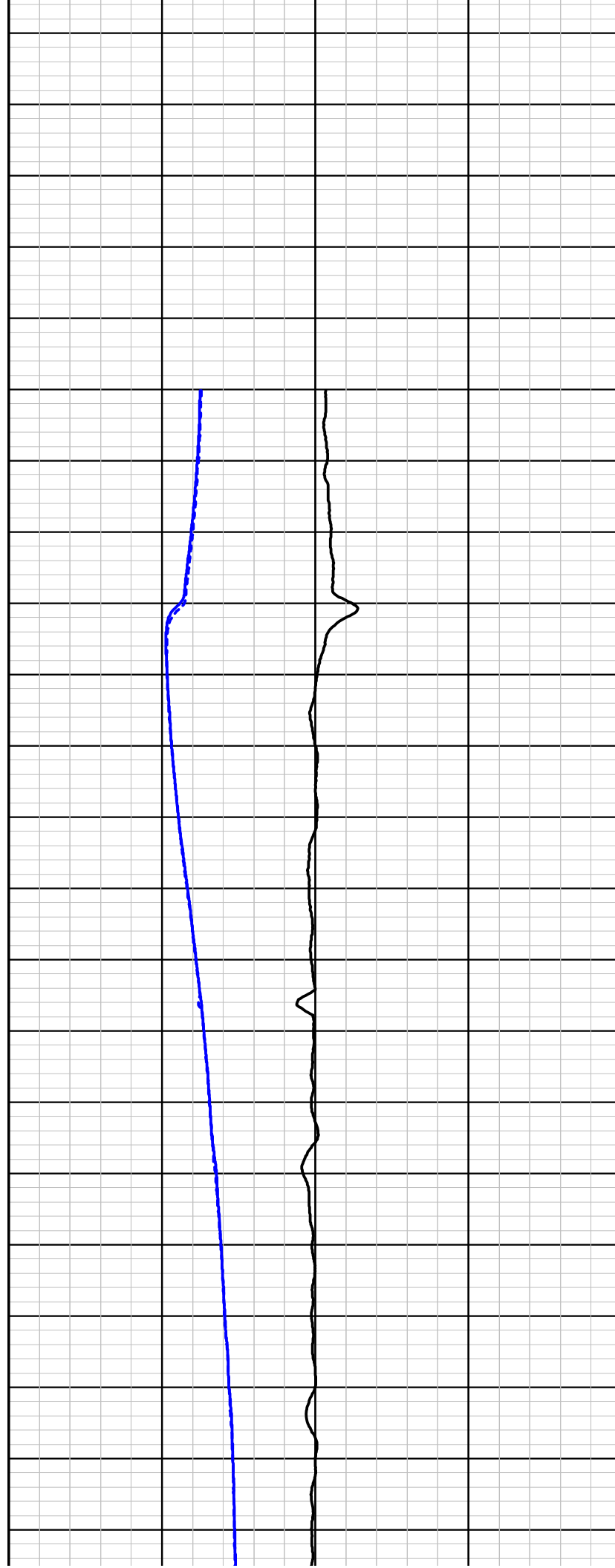
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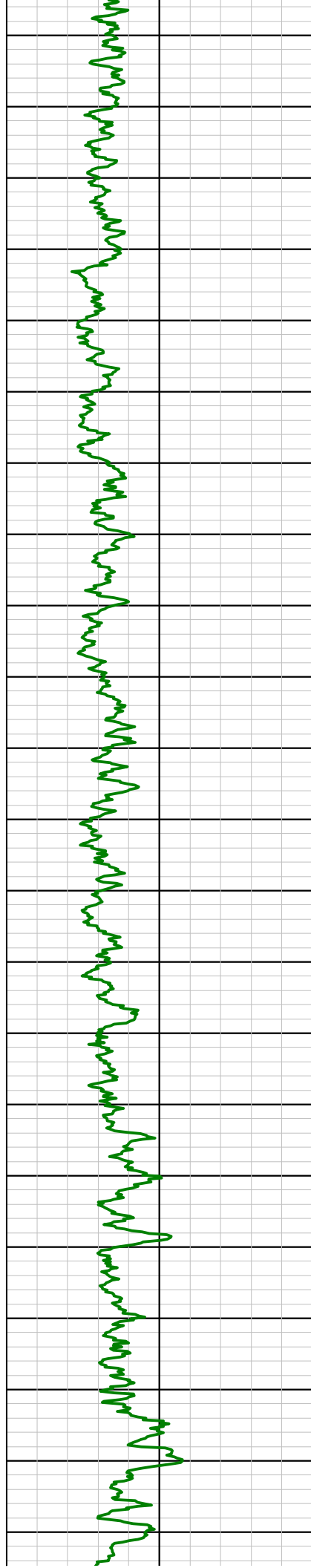
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340.0

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380.0





400.0

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440.0

460.0

480.0

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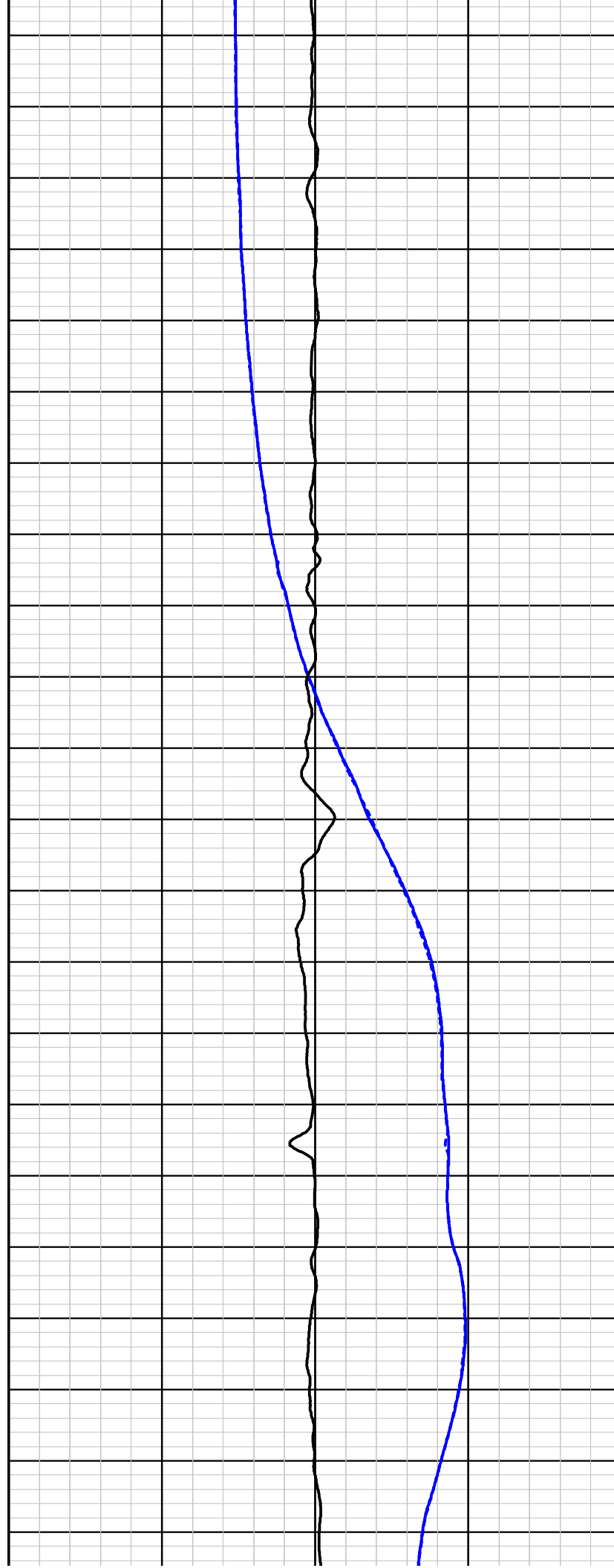
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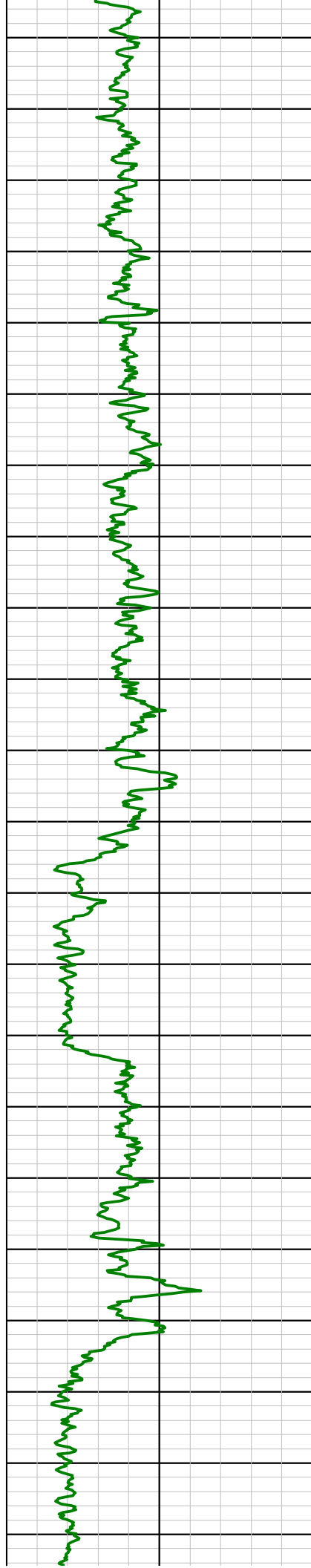
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560.0

580.0

600.0





620.0

640.0

660.0

680.0

700.0

720.0

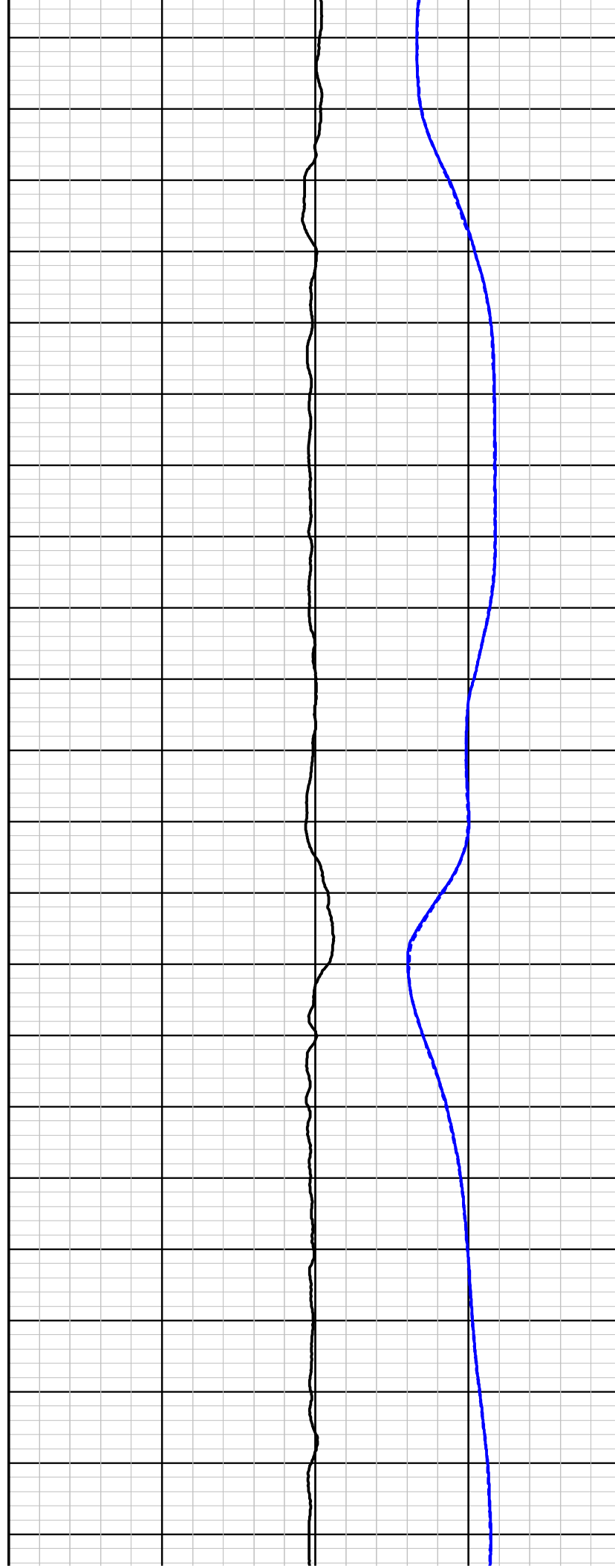
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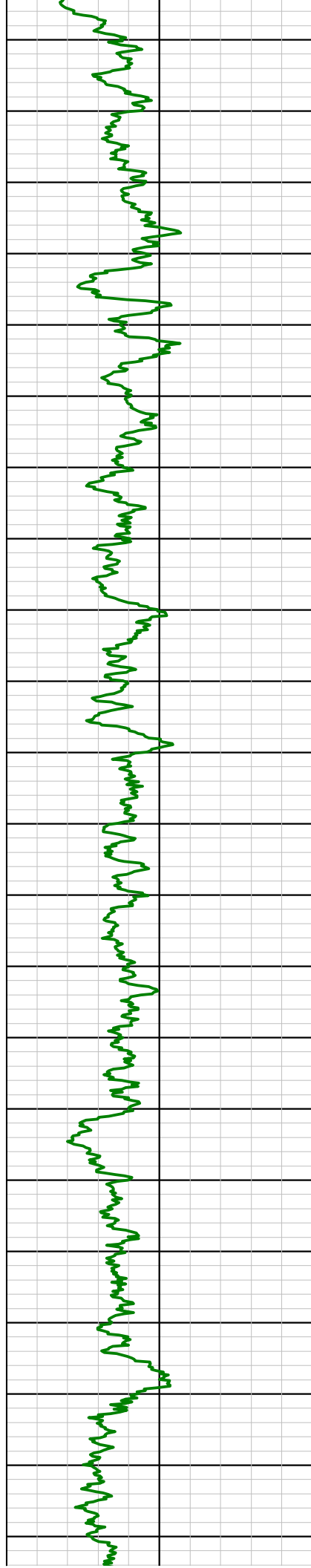
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780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

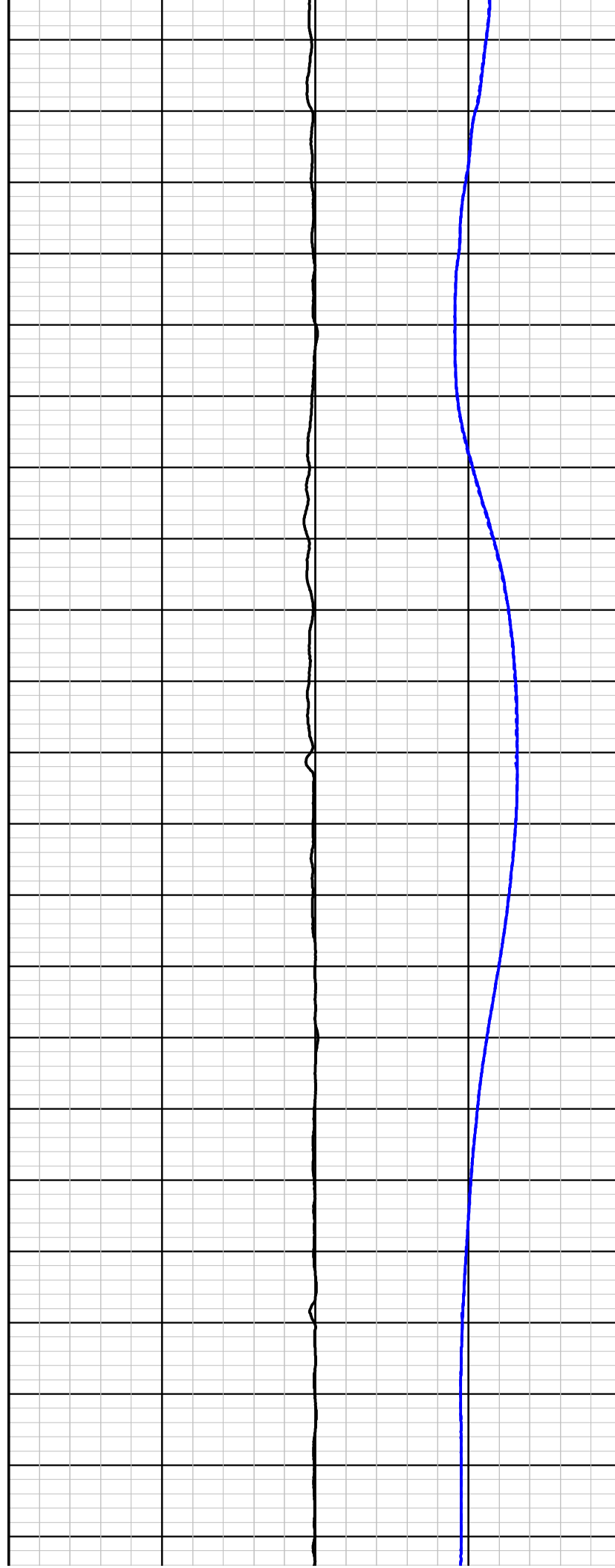
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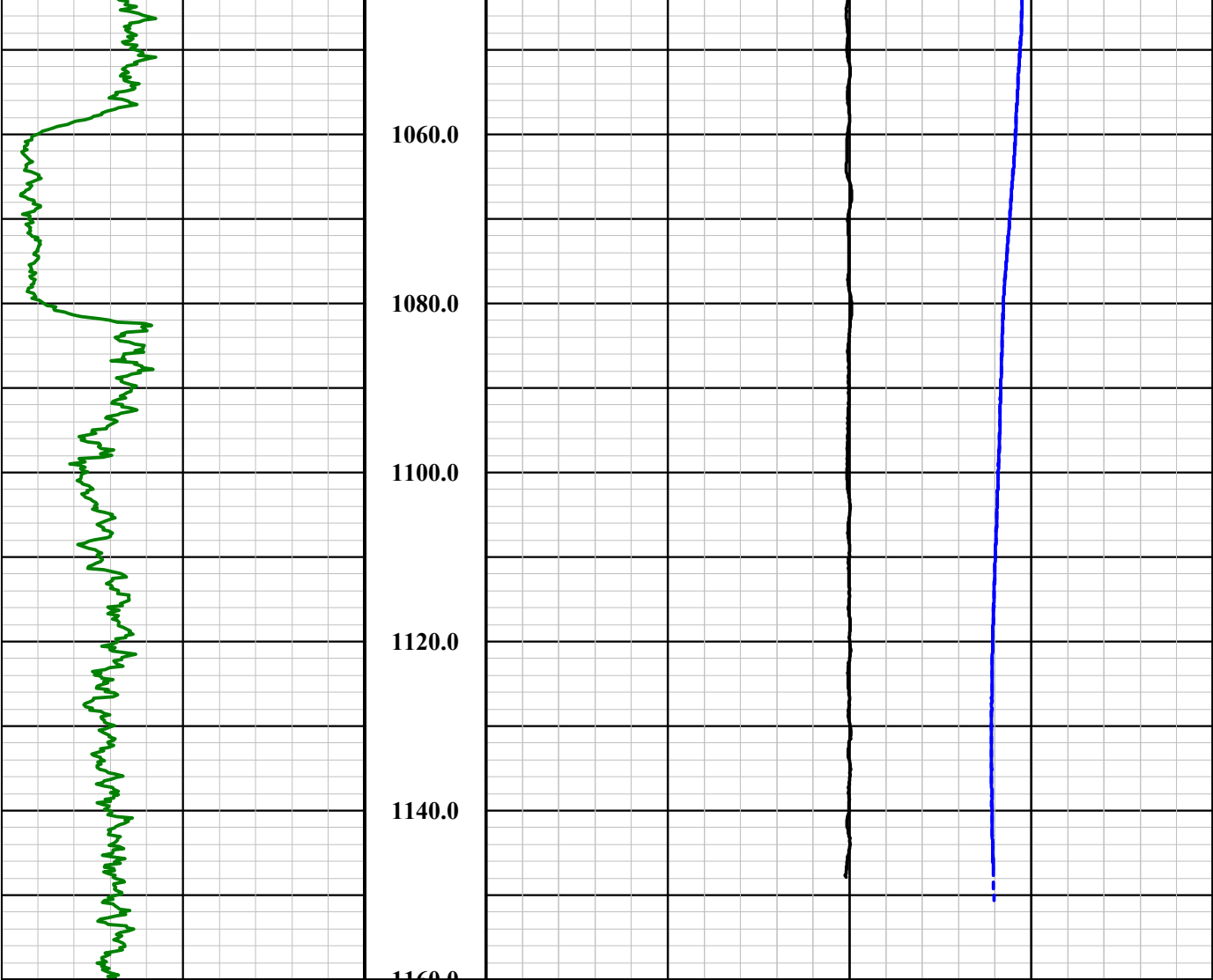
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1040.0





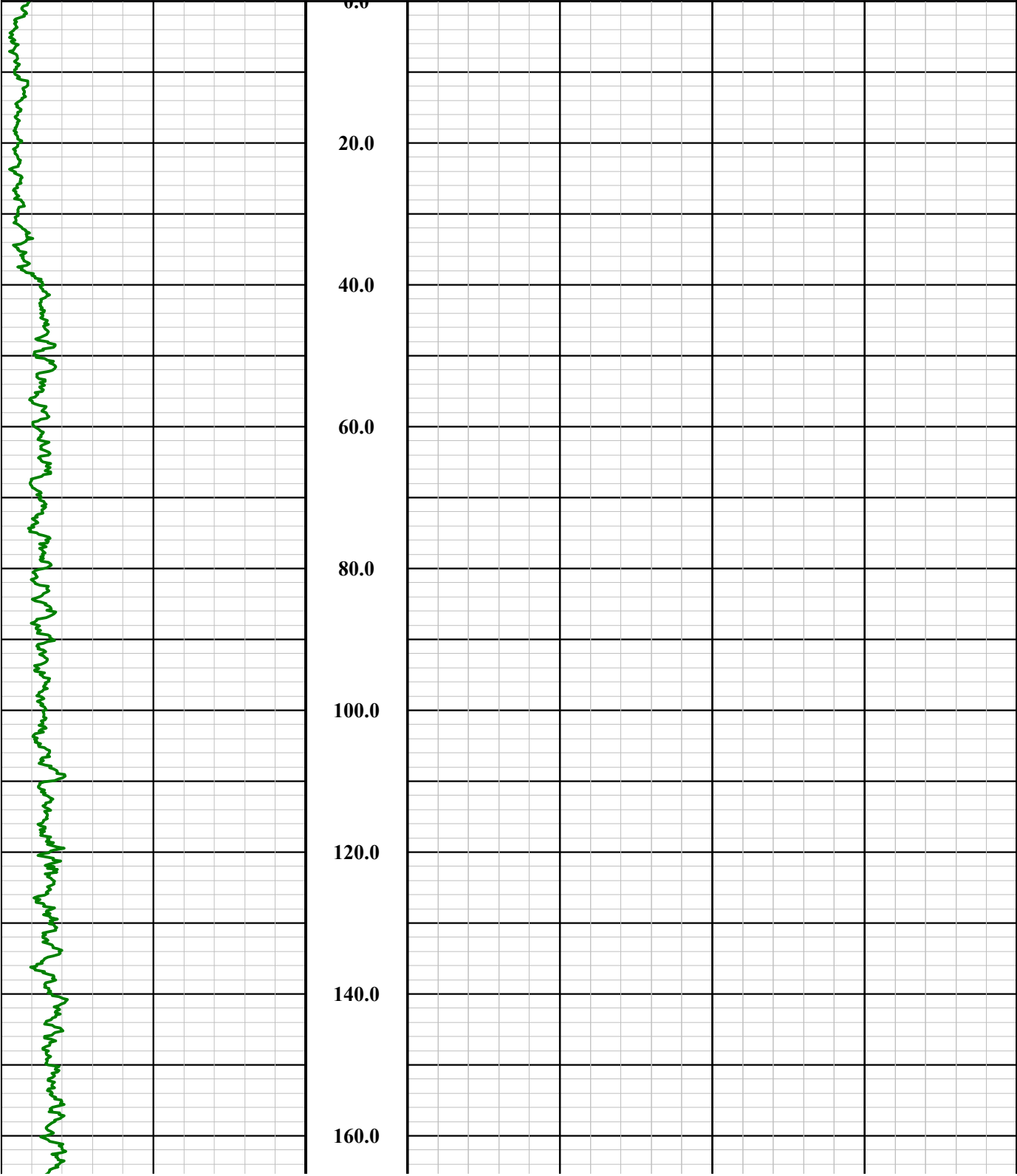
WB-03 Temperature Evaluation

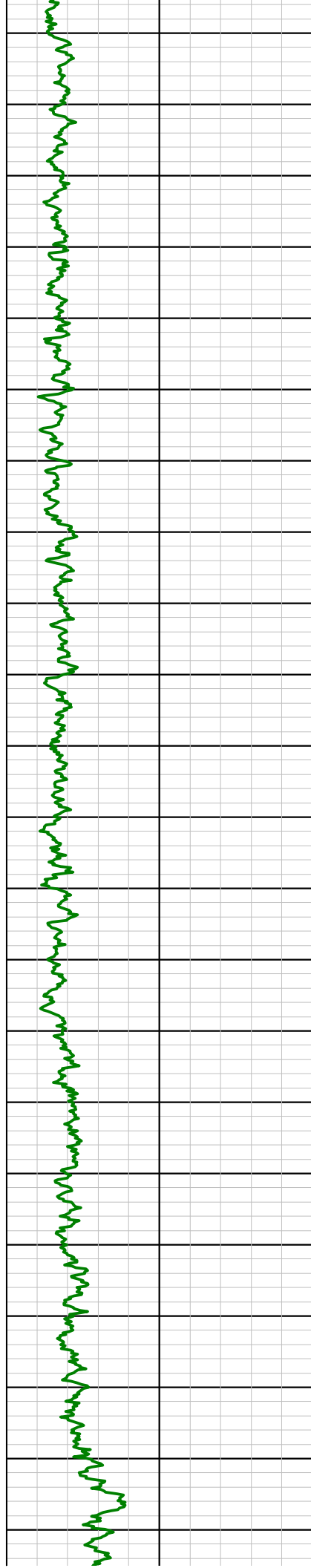
0	API	400
<hr/>		
Nat. Gamma		
Base of Lowermost USDW: 300 Ft		
Shut In Time: 24 Hours 0 Min		
Easting (NAD83): 847694.07		
Northing (NAD83): 746096.49		
Elevation: 1478.18 Ft		
Survey Date: 02-17-21		
Well Name: WB-03		
Hole Information		

1in:20ft Depth	-2	Deg F	2
	<hr/>		
	Differential Temperature		
	60	Deg F	100
	<hr style="border-top: 1px dashed;"/>		
	Temperature (1:17 PM)		
	60	Deg F	100
	<hr/>		
	Temperature (9:17 AM)		

Hole Information	Depth	Temperature (8:25 AM)	
	1in:20ft	60	Deg F 100
Well Name: WB-04		Temperature (12:25 PM)	
Survey Date: 02-17-21		60	Deg F 100
Elevation: 1478.17 Ft		Differential Temperature	
Northing (NAD83): 746131.41		-2	Deg F 2
Easting (NAD83): 847659.81			
Shut In Time: 24 Hours 0 Min			
Base of Lowermost USDW: 300 Ft			
Nat. Gamma			
0 API 400			

WB-04 Temperature Evaluation





180.0

200.0

220.0

240.0

260.0

280.0

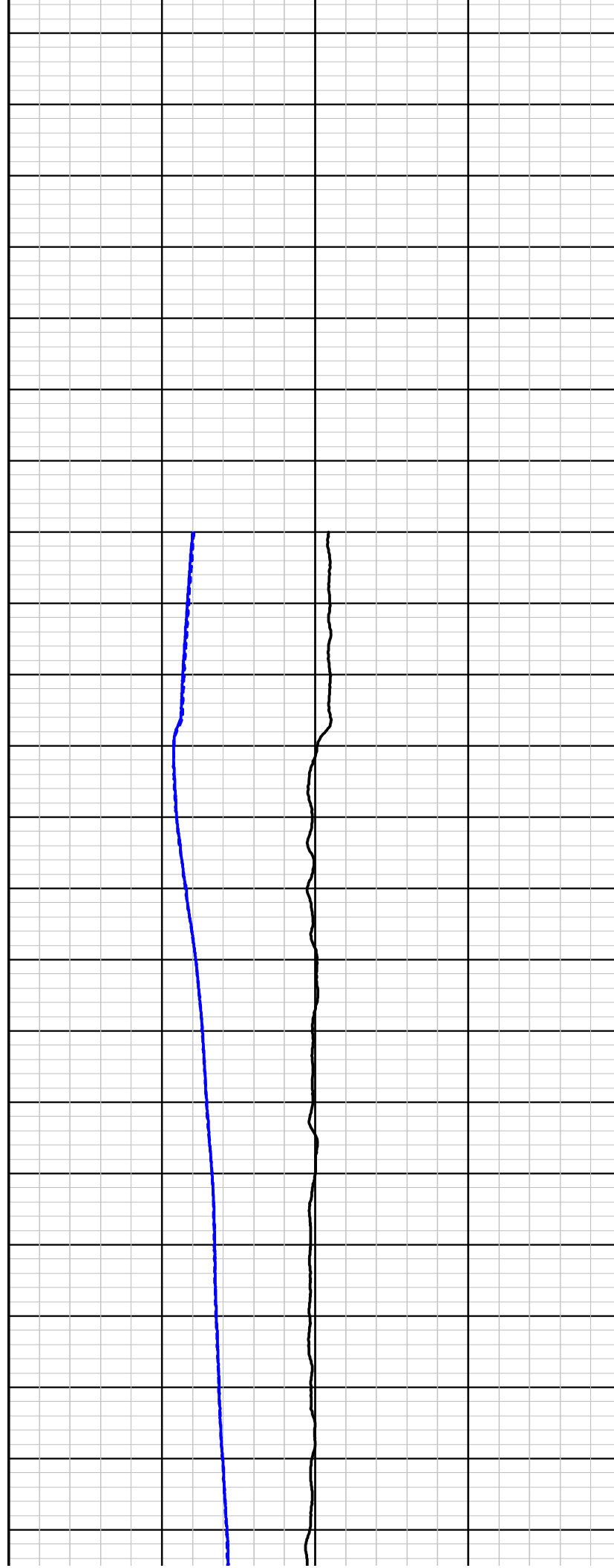
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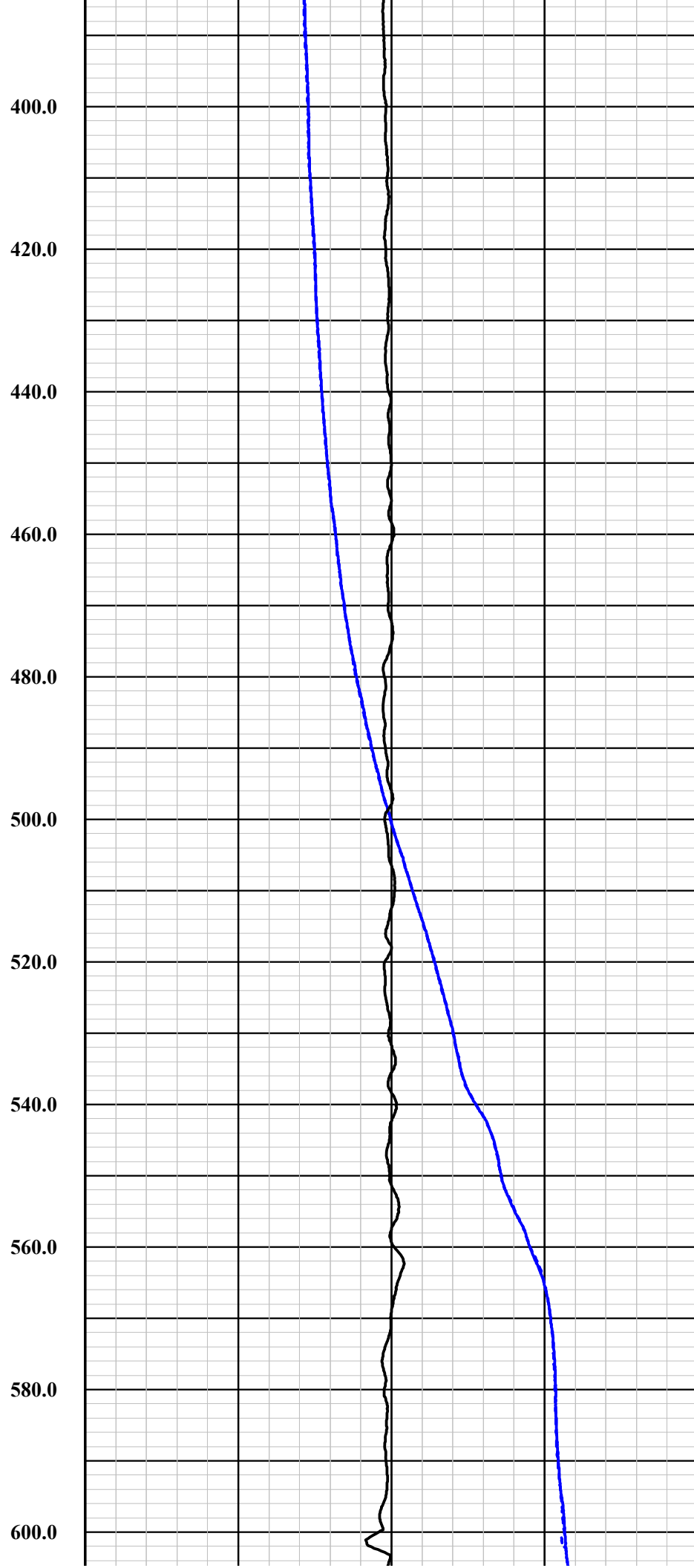
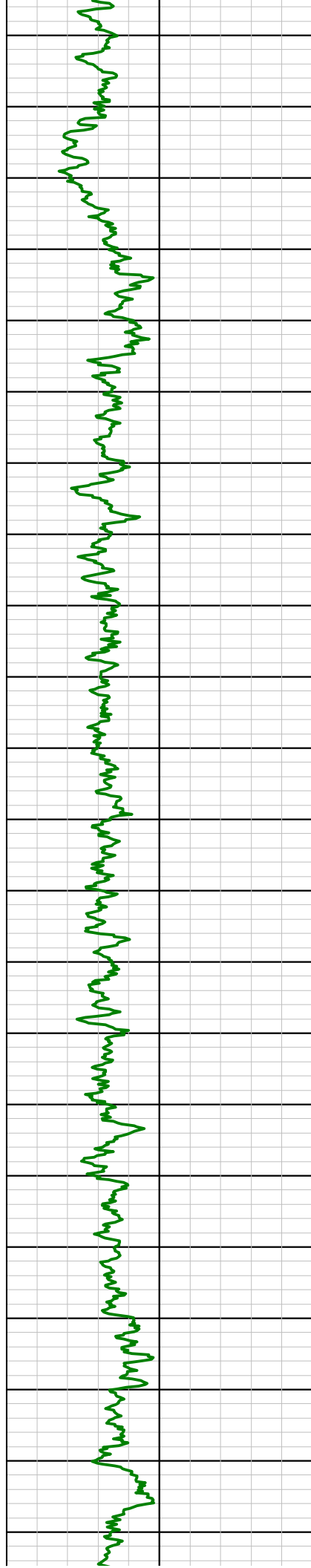
320.0

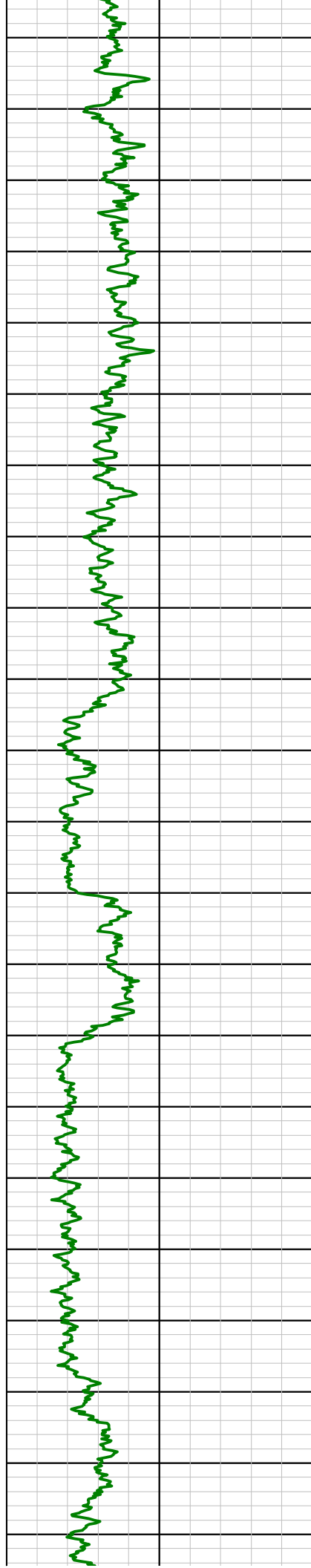
340.0

360.0

380.0







620.0

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680.0

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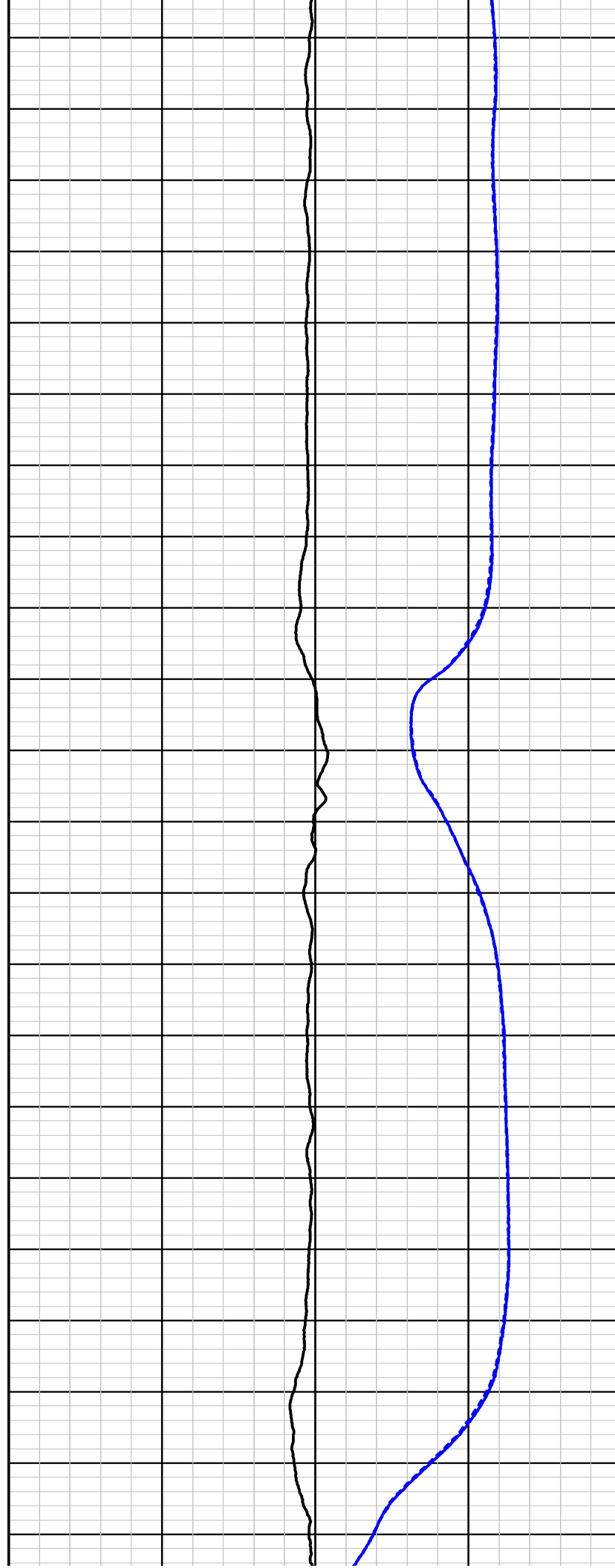
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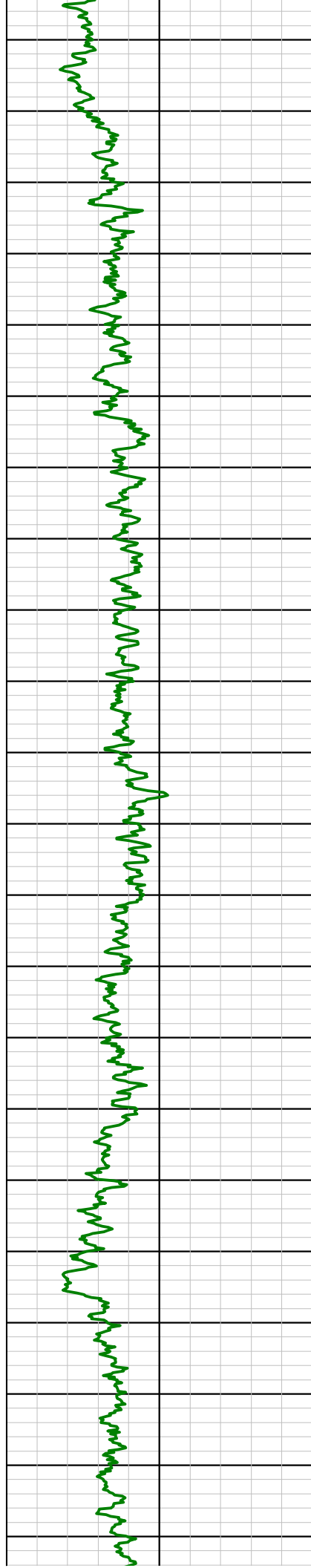
760.0

780.0

800.0

820.0





840.0

860.0

880.0

900.0

920.0

940.0

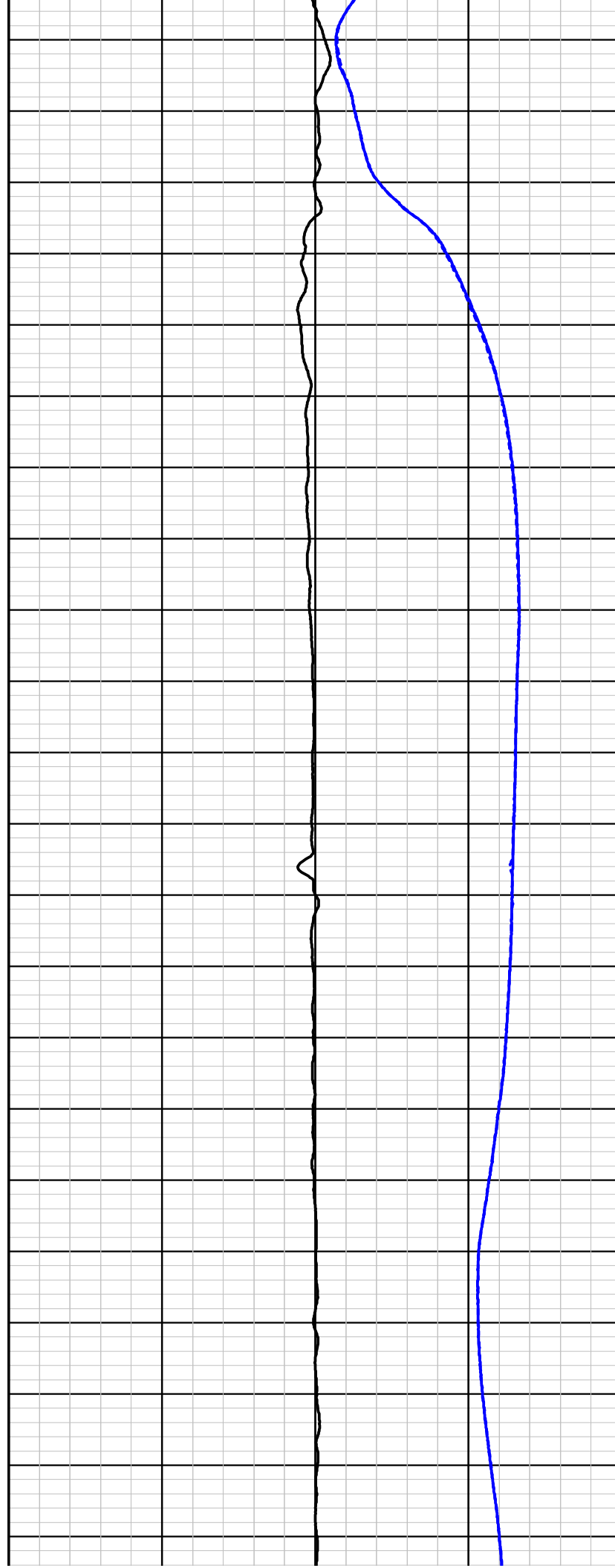
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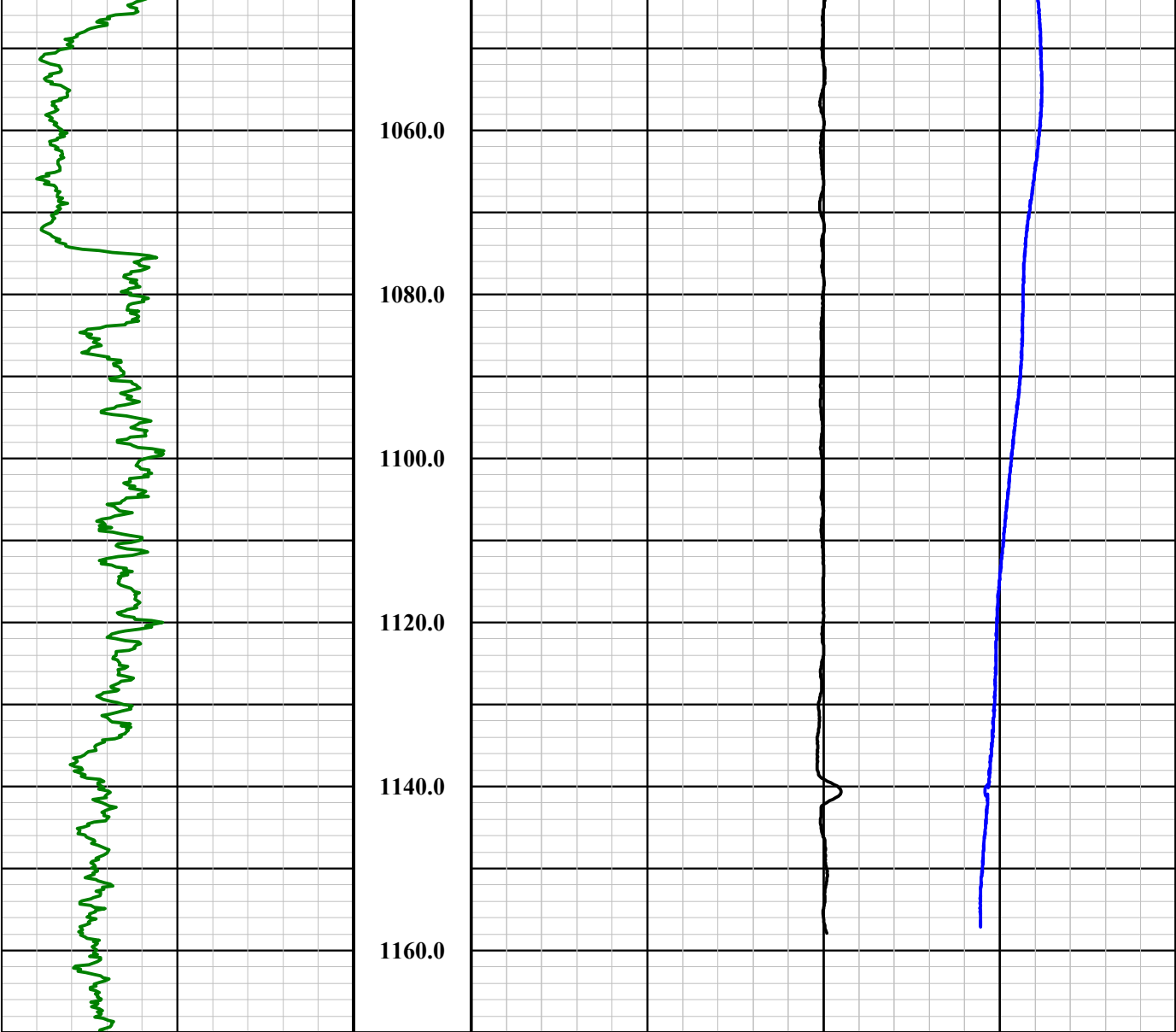
980.0

1000.0

1020.0

1040.0





WB-04 Temperature Evaluation			
<div>0 API 400</div> <div><div>Nat. Gamma</div></div> <div>Base of Lowermost USDW: 300 Ft</div> <div>Shut In Time: 24 Hours 0 Min</div> <div>Easting (NAD83): 847659.81</div> <div>Northing (NAD83): 746131.41</div> <div>Elevation: 1478.17 Ft</div> <div>Survey Date: 02-17-21</div> <div>Well Name: WB-04</div>		<div>-2 Deg F 2</div> <div>Differential Temperature</div>	
		<div>60 Deg F 100</div> <div>Temperature (12:25 PM)</div>	
		<div>60 Deg F 100</div> <div>Temperature (8:25 AM)</div>	
	1in:20ft Depth		

APPENDIX C

Daily Average Flow Rates and Water Level Elevations

APPENDIX C-1**DAILY AVERAGE FLOW RATES FOR INJECTION****AND RECOVERY WELLS DURING TEMPERATURE LOGGING**

FLORENCE COPPER, INC.

FLORENCE, ARIZONA

Date	Daily Average Flow Rate in Gallons per Minute														
	I-01	I-02	I-03	I-04	R-01	R-02	R-03	R-04	R-05	R-06	R-07	R-08	R-09	O-02	O-03*
2/17/2021	26.53	27.64	27.50	26.60	10.00	14.65	10.07	10.07	10.14	7.57	12.57	10.00	30.14	5.28	0.49

* ran from 01:00 - 02:09

APPENDIX C-2**DAILY AVERAGE WATER LEVEL ELEVATIONS****DURING TEMPERATURE LOGGING**

FLORENCE COPPER, INC.

FLORENCE, ARIZONA

Date	Daily Average Water Level Elevation in Feet Above Mean Sea Level															
	R-01	R-02	R-03	R-04	R-05	R-06	R-07	R-08	R-09	O-01	O-02	O-03	O-04	O-05	O-06	O-07
2/17/2021	1227.20	1202.53	1156.28	1165.50	1195.27	1207.11	1238.56	1231.07	1226.64	1243.46	1233.07	1239.71	1243.87	1242.13	1241.79	1241.86